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Section Two • November 15, 1997

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CIO Enterprise, a new resource to help CIOs, CEOs and other senior executives collaborate in achieving technology-enabled enterprise business value.

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Speeding
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Section Two • November 15, 1997

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Can You Keep
Your Business
Model From
Becoming
Obsolete?

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Speeding to Market

How Honda
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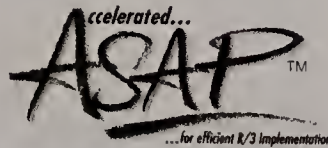
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SECTION 2

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COVER STORY: ORGANIZATIONAL INNOVATION

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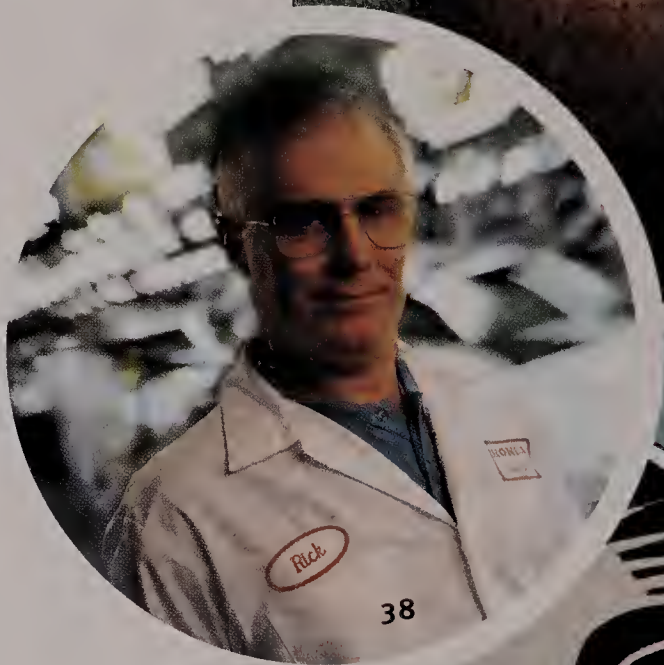
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ON THE COVER: Ron Shriver and Charles Allen, vice presidents of Honda of America, leave slow production schedules in the dust with the '98 Accord.

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CHECKS & BALANCES Returns on technology investments should be far from fuzzy. If benefits can be observed, they can be counted. *By Douglas Hubbard*

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LEARNING CURVE Proponents of groupware believe it encourages collaboration and provides a framework for teamwork. *By Derek Slater*



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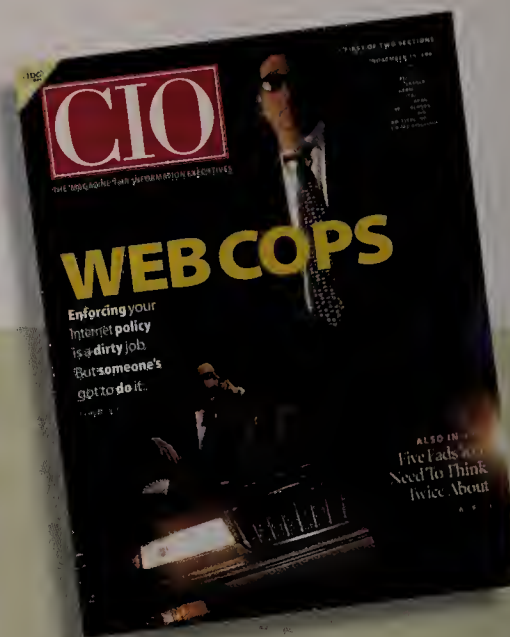
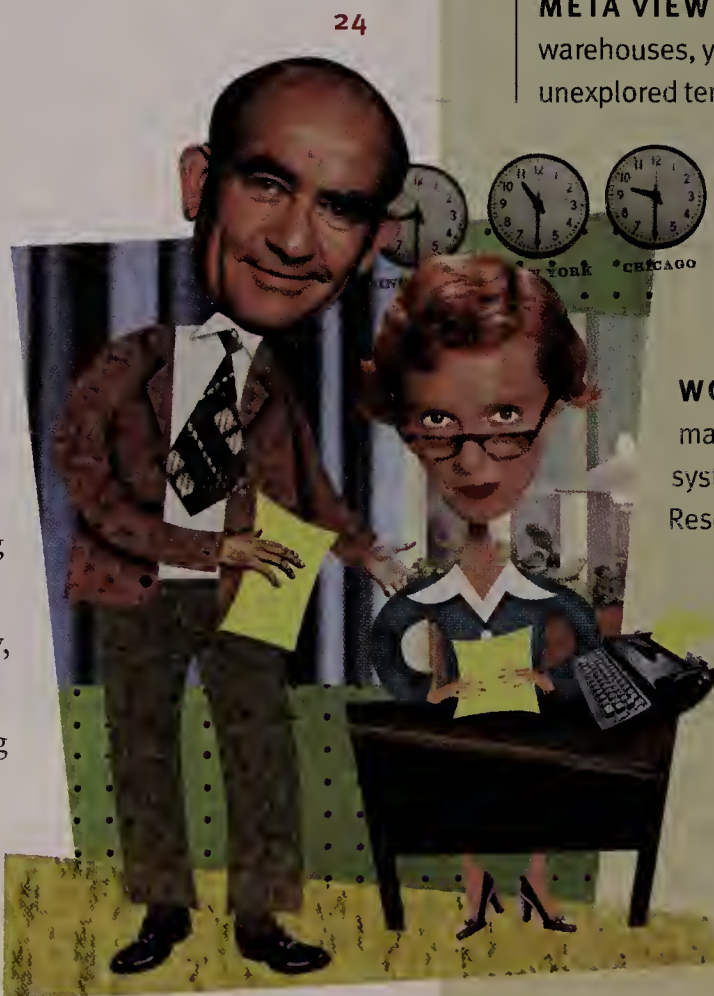
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REALITY CHECK Co-opetition, enterprise resource planning software, IT/business alignment, secure electronic commerce and push technology get a critical look.

COVER STORY: NETWORK

MANAGEMENT Laying down the law on employees' Web access may pay off if productive time and company assets are at stake.

CAREER DEVELOPMENT CIOs find a roundtable of their peers is the best place to get both information and advice.

META VIEW To provide Web access to data warehouses, you'll have to navigate through unexplored terrain.

EMERGING

TECHNOLOGY IS departments are scrambling for greater storage capacity.

WORKING SMART An automated applicant management system means Texas Health Resources can cut costs and increase productivity.



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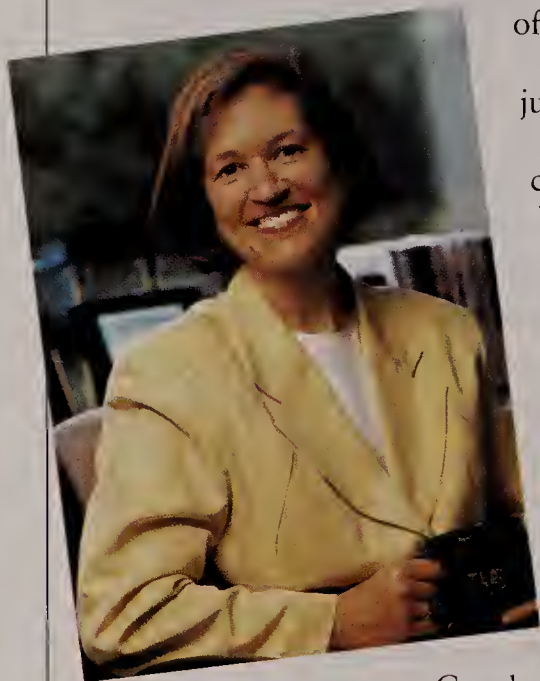
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Re: Promises, Promises

IT USED TO BE THAT VENDORS pitched products: Here's my widget, here's what it does, this is what it looks like. But these days, vendors have given up pitching products in favor of selling *solutions*. Why offer a mere product, the logic goes, when one could tempt would-be customers with the power to solve their problems? A little slice of nirvana, brought to you by my widget. Slick marketing materials touting the benefits of so-called "end-to-end solutions" make purchasers seem savvy businesspeople instead of mere consumers.



Sometimes the promise of a solution is just too alluring to resist.

We all know that technology well applied can help solve some of the most vexing business challenges. But the corollary—that even the most ingenious technology is a waste if it doesn't address the needs of the business—isn't always the no-brainer it should be. If it were obvious, the CEO of a fast-growing teleservices company would not have succumbed so easily to a persuasive pitch for a data warehouse his company didn't need, a story of broken careers and wasted money that Lauren Gibbons Paul chronicles in "Anatomy of a Failure" on Page 54.

Caught in a trying situation, the executive so wanted to believe in the promise of a solution that he didn't stop to consider if his problem was one the solution purported to solve.

The mismatch between that teleservices company's needs and the "solution" of a data warehouse was only the first of many warning signs that Gibbons Paul uncovered when researching the story. The CEO's decision to launch a data warehousing effort at all costs set in motion a chain of events that would leave a trail of ignored red flags in its wake—flags that offer business and IT executives insight into how to avoid falling for an enticing solution to someone else's problem.

Alice Dragoon

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**Sometimes
the promise
of a solution is
just too alluring
to resist.**



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In My Opinion

Leveraging the technology for business gain is the name of the game.

CIOS HAVE SOME TOUGH decisions to make. Every department executive from marketing to finance to production to sales to human resources is pressuring the IS department for an Internet application. But unlike past years, CIOs can ground their decision making in reality with the help of facts, figures, benchmarks and ROI. Now that the hype surrounding the Internet and all its components—intranet, extranet, Web and push—has settled down, CIOs are assessing the technologies with a critical eye. According

to Deloitte & Touche LLP's Ninth Annual Survey of North American Chief Information Executives, 82 percent of respondents claim Internet-related spending will increase but not as significantly as last year.

Why the caution?

Costs are rising. Applications are more complex. The environment has not matured as expected. Business executives need to work closely with the CIO to ensure a positive bottom-line outcome. Leveraging the technology for business gain is the name of the game. Without this goal, collaboration projects will never get off the

ground. To compound the challenge, the CIO has to worry about not only the bottom line but also lack of security, standards, development tools, immature technologies and other high-priority projects.

CIOs have the thankless task of approving or denying another executive's technological request. They must weigh and reweigh. Balance priorities. Look at the budget and decide the best strategies. If everyone in the organization places the enterprise first and their own departments second, the final outcome stands a better chance of success.

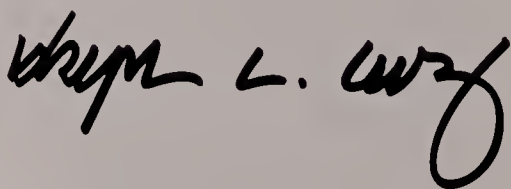


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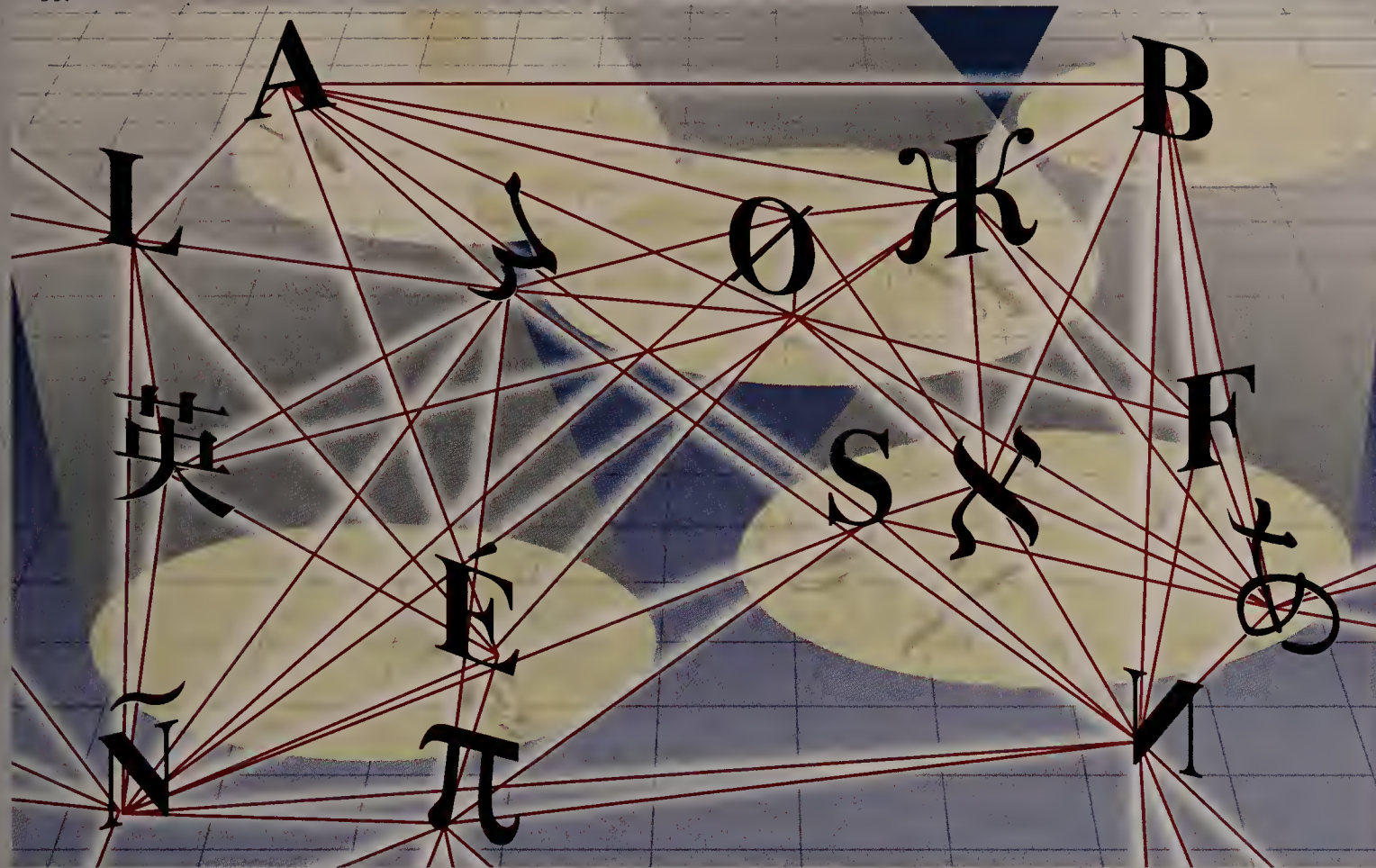
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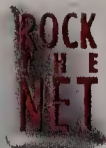
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SOS from Parts Unknown

IN NEW JERSEY, A SINGLE CAR accident can prompt as many as 50 cell phone users to call 911 as they pass by. While that is certainly preferable to prompting no calls at all, the calls aren't much good to 911 dispatchers if the callers have no idea where they are or where the crash occurred.

The problem is especially acute if only one person reports a problem, says **S. Robert**

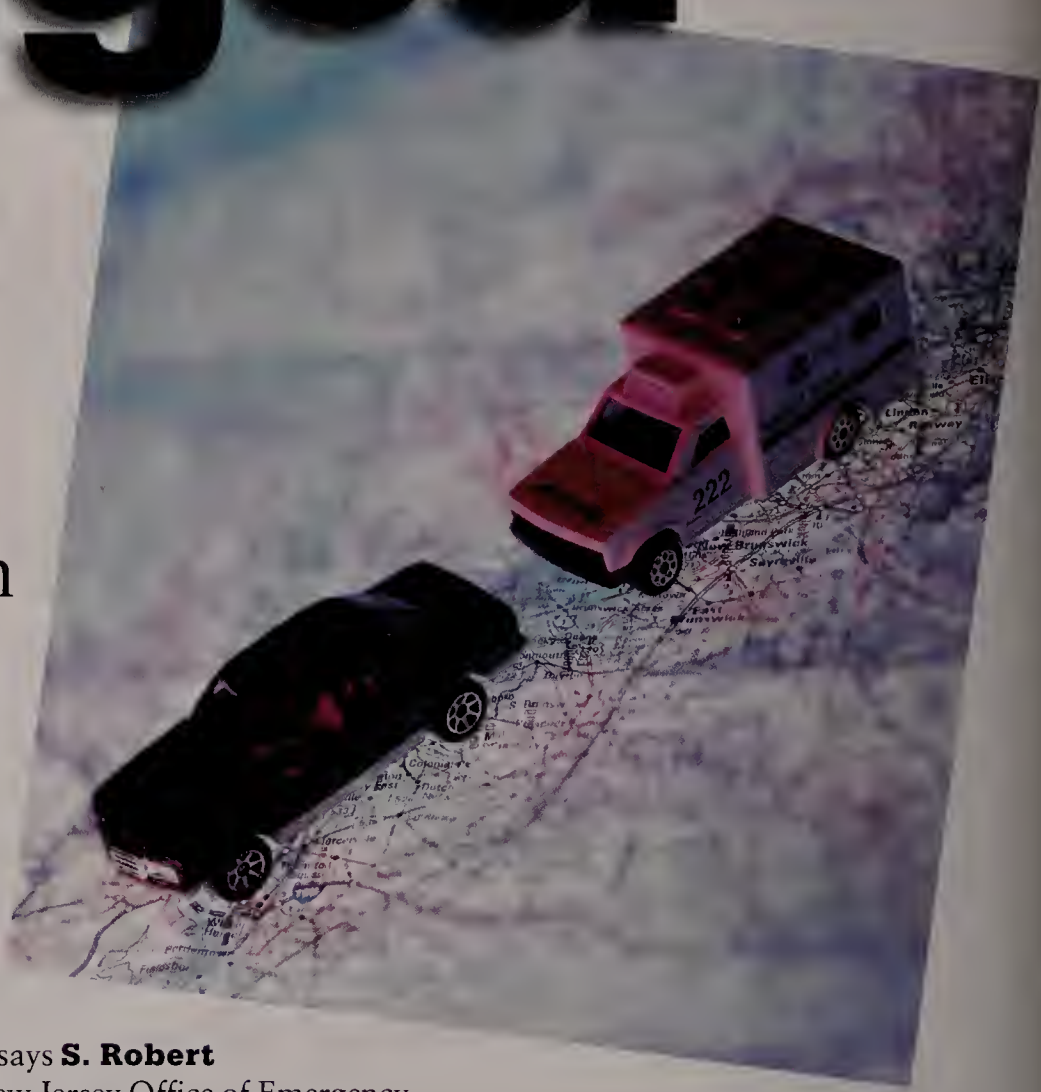
Miller, executive director of the New Jersey Office of Emergency

Telecommunications Services (OETS). "We first got enhanced 911, which gave us the call-back feature so we could automatically call back a number from which a call had been placed. Then the systems could pull up the addresses of the numbers, assuming callers were calling from a residential address. But today, with cellular phones, we are back at square one with no idea how to locate people."

To pinpoint caller locations more easily and accurately, in January OETS launched a 911 trial program that automatically assigns a latitude and longitude to the location of the cell phone call and plots it on a digital map. Using mapping technology from MapInfo Corp., the program enabled 911 dispatchers in four New Jersey counties to identify callers' locations seconds after a call was made. With over 50 percent of all 911 callers dialing in while panicked or confused about their location, this mapping capability was good news for dispatchers—not to mention for those calling in. For example, in the spring, a woman called 911 because her car died on a back road. Frightened and disoriented, she couldn't remember where she was, but the 911 dispatchers pinpointed her exact location and talked to her until help arrived.

So far, New Jersey is the only state with a 911 system capable of mapping the location of cellular callers. Although the program was temporarily suspended in April for evaluation, OETS hopes to expand it across the state. From January to April, the program helped 911 receive and map 3,504 live calls. "What was so neat about this program is what didn't happen," says Miller. "We were able to locate everybody who called and never had any problems."

—Jennifer Bresnahan



Survey Says

CFO Index

75 percent of CFOs say they lead shareholder initiatives. Between **56** percent and **65** percent expect to be a player in mergers and acquisitions in the next three years. CFOs whose company stock outperformed competitors' spend **20** percent of their time with business unit executives. The same group makes decision-support activities their number-one development priority.

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New Dimensions in the Data Center

In most corporations, the enterprise data center contains a hodgepodge of hardware and software (e.g., multiple flavors of high-end Unix, OS/390 and other proprietary systems), requiring disparate support infrastructures and offering little in the way of integration.

Since this is unacceptable to the customer, IT groups and vendors are working to unify these technologies

through integration “middleware,” migration to common platform architectures and the provision of multiple “personalities” in a single box.

With these technologies viewed as back office, and newer network computing technologies considered front office functionality, the challenge for IT organizations (and vendors) is to join both capabilities seamlessly by providing a “middle office” set of systems and procedures that “glues” the other two together (see Fig. 1).

As more back-office (and some front-office) tasks are relegated to external providers (e.g., outsourcers), most Global 2000 companies are developing a mix of internal and external service provisioning. IT’s expanded purview of responsibility encompasses the needs of customers, external suppliers, e-commerce linkages, and processes that are cost-effective with the current environment.

The challenge is heightened by new initiatives such as data warehousing, network comput-

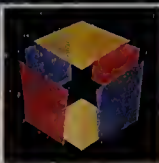
ing, business intelligence, e-commerce and “Webification” of business applications. Along the way, remedial issues such as Year 2000 compliance and Euro conversion (which are consuming as much as 30% of IT resources and budgets) must also be addressed. To achieve these goals, IT groups must prioritize the elements that will ensure that changing customer requirements are met, as well as identify criteria for selecting strategic vendors to share the burden of meeting these goals.

Of the ten critical success factors META Group has identified for the future enterprise data center (see p. 4), this supplement will focus on four: integration, scalable/flexible platforms, universal data/media and asset management.

Although IT has ultimate responsibility for customer satisfaction, vendors also play a key role. IT must make tough choices now on which vendors will help energize their future enterprise data center.

BY BRUCE ALLEN

Vice President, META Group
Enterprise Data Center Strategies



Ten Principles for the Success of the Future Enterprise Data Center

1) Integration: To ensure optimal flexibility for users to access systems and data across disparate platforms and networks, a mix of off-the-shelf technologies (e.g., MQSeries, DCE, ORBs, distributed transaction monitors) must be complemented by IT services. Network gateways, bridges, routers, channel attach and other mechanisms are also required to link information resources. Encryption, authentication, network firewalls, resource access/control and intruder monitoring must be addressed via a cohesive security policy and implemented with the appropriate tools.

2) Scalable/flexible platforms: Short- and long-term scalability of CPU (server), memory, data storage and network bandwidth must be assured, with flexibility to adapt to new technologies in each category.

3) Universal data/media (storage): Technologies include open storage, backup/restore software, tape devices, automated tape libraries, hierarchical storage management (HSM) software and database monitoring software that address all platform requirements. Management support includes backup, restore, archival, data placement and usage monitoring.

4) Asset management: This is achieved through the implementation of the aforementioned items, as well as the traditional capabilities of inventory, configuration, contract and vendor management.

5) Application management: Provides application development, software life-

cycle management tools, configuration/change management, and all associated support services.

6) Workload management: Includes the areas of load balancing, batch scheduling, workload prioritization, print/output spooling and appropriate resource sharing.

7) Service-level/availability management: Requires appropriate OS, subsystem and application instrumentation to provide status information on system, network and application resources. These tools must also tie into performance-, problem- and fault-monitoring tools. Availability management capabilities include OS/resource partitioning, clustering, clustered file systems, ability to perform preventive maintenance without incurring downtime, etc.

8) Operations management: The provisioning of console/network monitoring, production support, and general monitoring of workloads as they are processed.

9) Performance/capacity management: Tools include performance collection software, automated analysis of performance data in relation to service levels, intelligent (rules-based) response to abnormal situations, and a capacity planning model or tool to project future requirements.

10) Infrastructure development management: Development of an organizational core competency around infrastructure problems. Includes many of the other nine areas, with emphasis on middleware and application management.



INTEGRATION

Integration is the most critical success factor for the future enterprise data center. This issue is synonymous with the issue of standards; the middleware components that bring about integration are only as effective as they are pervasive. Individual vendor initiatives to extend "standard" middleware often render them non-standard.

It will require key vendor initiatives based on strong alliances to "glue" these disparate integration technologies together. These technologies include platform-based architectures (e.g., non-uniform memory access [NUMA], S/390 Parallel Sysplex), data/storage architectures and middleware such as ORBs, SQL, gateways, distributed transaction monitors and messaging.

Looking out to 2000/01, META Group believes S/390 (with Parallel Sysplex) and NUMA (with Intel) will pervade most enterprise platforms (HP, Sun and IBM will have NUMA-based platforms in this time frame) as the means of tying small groups of processors into larger processor clusters. NUMA offers the advantage of symmetric multiprocessing (SMP) technology with theoretical massively parallel processing (MPP) scalability.

While SMP clustering is generally limited to 16-32 proces-

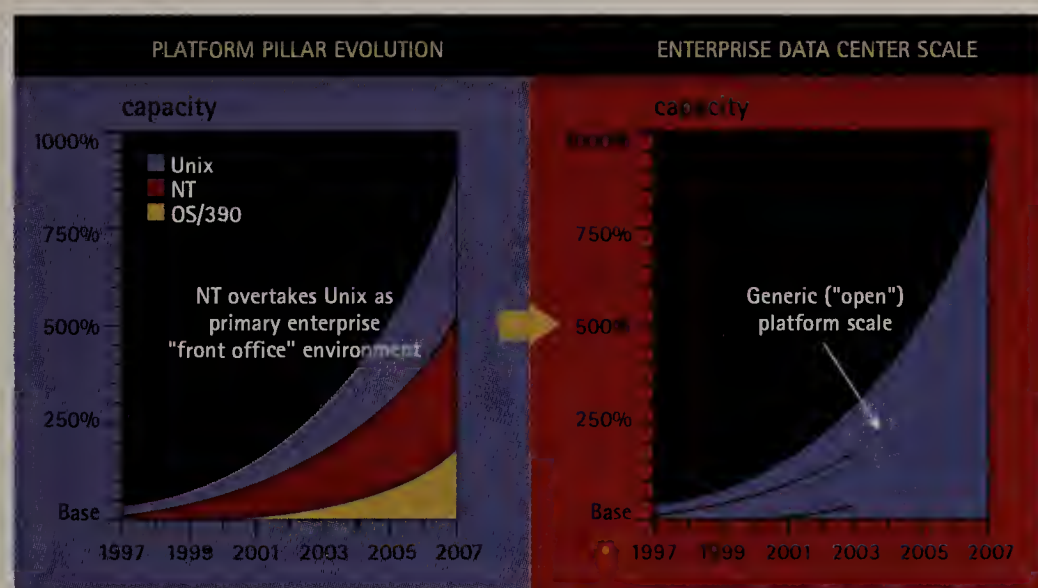
sors, NUMA servers will soon handle up to 252 processors. The advantages of NUMA translate into higher availability, reduced cost and the ability to consolidate workloads into fewer servers, thus minimizing management overhead and providing economies of scale.

Data/storage architectures are required to provide common access to data (regardless of platform, data structure, etc.) and a common means of providing backup/recovery, archival, HSM and database/data ware-

create an integrated storage hierarchy that provides trade-offs between cost and service.

In the area of security, the purpose of DCE was to provide integration for network authentication of users through Kerberos, DES encryption and database single sign-on. By 1998, however, Netscape and Microsoft will have driven reasonably effective encryption and authentication mechanisms (via a successor to Secure Sockets Layer) into their markets. By 1999, those technologies

Enterprise Data Center Scale Requirements



Source: META Group

house interoperability. While vendors such as EMC (in partnership with database and platform vendors) will lead the way in providing enabling technologies, IT must adopt the appropriate support tools and develop systems and procedures to ensure maximum availability, service (speed of access) and data integrity. The goal for IT: to

(based on RSA and X.509) and LDAP will deliver enterprise directory capabilities. By 2001, this technology set, in a form called Public Key Infrastructure (PKI), will likely supersede DCE for authentication and, by 2003, for authorization.

In the context of ORBs, the Common Object Request Broker (CORBA) architecture is



Developers creating custom software for multi-platform distribution at large corporate sites are starting to seriously consider CORBA.

Political and technical obstacles will continue to prevent a universal SQL middleware product.

key. Lack of interoperability has limited CORBA's usefulness as a standard for distributing objects (i.e., its ability to act as an object traffic cop) but implementations such as Universal Networked Objects have helped. Developers creating custom software for multi-platform distribution at large corporate sites are starting to seriously consider CORBA. OLE/DCOM, by virtue of Microsoft's continued push, will become a major consideration.

SQL interfaces/middleware are a difficult proposition for many users. Most client/server implementations use the merchant database vendors' products (e.g., Oracle SQL*Net, Sybase OpenClient). SQL will remain an important middleware standard, with the merchant RDBMS vendors supplying the bulk of the technology.

While greater interoperability will always be a goal, politi-

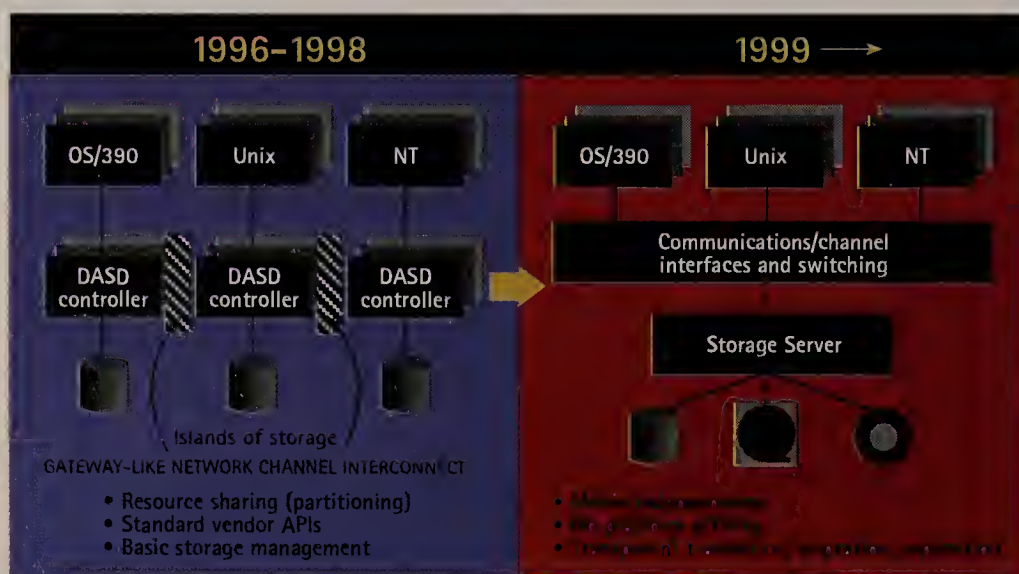
cal and technical obstacles will continue to prevent a universal SQL middleware product. And as data-driven IT architectures include more disparate data sources (including legacy databases) and performance requirements, users will have to move beyond SQL middleware.

In terms of third-party SQL interfaces and gateways, Microsoft's ODBC, Information Builders' EDA/SQL, Oracle's SQL*Connect and Sybase's OmniSQL provide database independence for applications with limited performance requirements. The best use of this technology is to enable client access to data warehouses (i.e., most DSS tools support ODBC on Windows), or to support batch extracts and transfers from one database to another. SQL gateways are also marketed as enabling a "SQL view" of non-relational data (VSAM, IMS, IDMS, RMS), but the usefulness of these products is restricted by the data schema changes in most legacy databases.

Distributed transaction monitors (e.g., Transarc, Tuxedo) are another enabler in IT's arsenal. CICS emulators on Unix (i.e., Unikix and VIsystems) enable cut-and-paste downsizing of CICS online systems, and support open-CICS to mainframe-CICS intersystem communications. But META Group does not project long-

Heterogeneous Storage Evolution

FIGURE 2



Source: META Group

with data located behind a variety of different operating systems—NT, UNIX, MVS. The key thing we're trying to do is pool that data together from all sources and create information out of it. We researched the market a great deal to help us develop this new information archi-

Phil Orton, Director
of Centralized Operations,
Entergy Corporation

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term success, due to user reluctance to load a full-scale CICS interface (API) on PCs.

In the longer term, message-passing and queuing middleware offers the most promise as users write more complex GUI-based applications. The non-blocking asynchronous model of this technology best fits the event-driven GUI programming paradigm. We believe IBM's MQI (message queuing interface) will be the messaging standard, with MQSeries and MQ 3-Tier deployment slowly increasing.

SCALABLE PLATFORMS

Even the most talented IT architects have been unable to project the evolution of hardware and software platforms. Nor have they been able to predict server/network application requirements, even within the first year. IT groups must adopt platforms that scale over at least a 5-year window to avoid costly conversions, migrations and disruptions to business. Since application forecasts (and longevity) often exceed plans, the real need is to "bullet-proof" enterprise technologies by providing a growth path (e.g., porting or normal scale increments) that will support the normal 5-10 year life for applications (see Fig. 2).

For most enterprise applications (i.e., more than 500 users

and 100GB of data), data centers will opt for OS/390 and high-end Unix until at least the second half of 1999, when NT Enterprise begins to offer new scale options.

By 2000/01, we foresee Unix consolidation around Sun Solaris, AIX and HP-UX, creating challenges for vendors and users. While we view S/390 as the most scalable hardware platform with its potential for 32x10-way (uniprocessors now at 62 MIPS, scaling to 100+ MIPS by 2000) configurations, Intel's IA-64 Merced architecture will significantly increase Unix/NT scale by 1999.

Meanwhile, users continue to back off from shared nothing architectures (i.e., MPP) in favor of SMP+ systems such as NUMA. We also believe that NUMA-based clustering and the continued trend toward NT will shift ISV focus and overall market perception to Wintel, including both Unix and NT permutations.

Sequent recently demonstrated its ability to provide Unix and NT partitions in its NUMA-Q 2000 server. This prototype, to ship in 1998, also highlights the capability of Oracle Parallel Server to scale across multiple nodes. Virtual Interface Architecture, an emerging high-speed communications interface, should provide better performance and

scalability (versus distributed message passing, or DMP) in such configurations. NUMA-Q 2000, however, represents the first NT-capable platform that can be configured in a distributed/DMP format, a large SMP system, or both simultaneously. This approach promises NT-scale investment protection and a migration path to NT.

NUMA technology represents a good compromise between traditional SMP and MPP architectures. Its key concept is the combining of "near" and "far" processor and memory resources (e.g., on a local node or not), transparently extending the SMP shared resource programming model. The I/O subsystem is based on 100MB/sec fiber channel interfaces, including fiber channel bridges accommodating SCSI and legacy peripheral support. Sequent's NUMA-Q 2000 is the first Intel-based NUMA system; we expect Sequent to establish OEM deals with other systems vendors to accelerate their transition to NUMA.

DATABASES/STORAGE

As Unix database servers grow (30-300 GB+), and as OS/390 data is increasingly accessed across disparate platforms, users must develop storage architectures to address issues of backup/restore, HSM, cross-platform access to tape

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NUMA-based clustering
and the continued trend
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NUMA technology
represents a good compromise
between traditional SMP and
MPP architectures.

devices and automated tape libraries. The pressing area of backup/recovery operations is driving early efforts, with emphasis on the integration of DBMSs with tape systems.

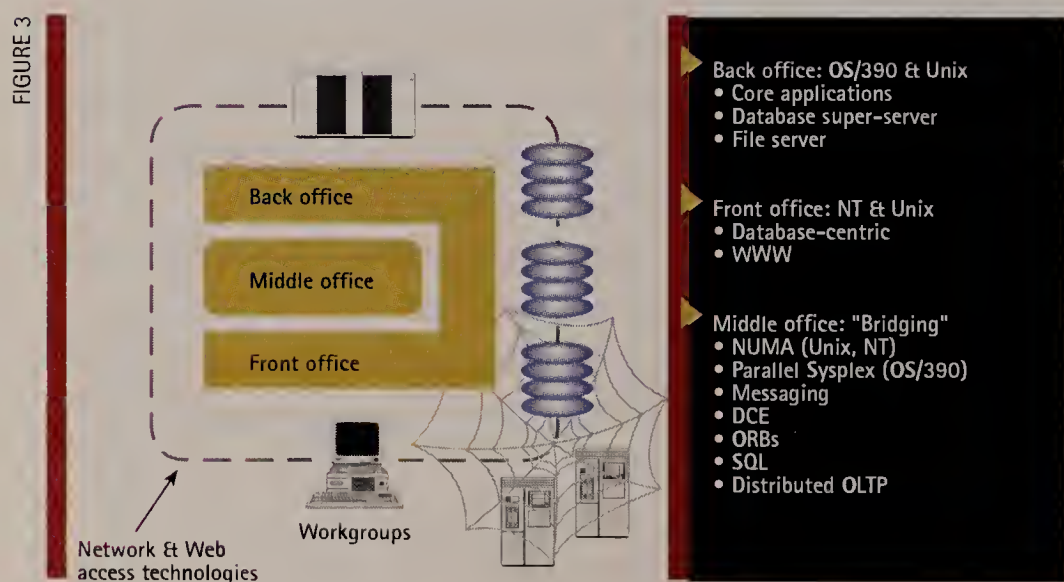
Despite rapid product evolution, led by vendors such as IBM and EMC, users will continually have to overcome technology limitations and lack of media and access method standardization through at least 2000. In 1997/98, users will combine automated storage hardware with more comprehensive network, Unix, OS/390 and storage management software/firmware implementations (see Fig. 3).

As the lines between online, offline and cache storage overlap, storage systems leveraged by enterprise HSM will enable distributed storage I/O subsystems to merge with S/390 subsystems in the enterprise data center. Linking disparate I/O

subsystems will enable single-point application access, the ability to join data from geographically dispersed and disparate data structures, and provide a foundation for common middleware and software transport functions. Enterprise I/O subsystem building blocks include serial and fiber connectivity technologies, multi-host connectivity and HSM software.

Storage subsystems are rapidly evolving. Sustained data transfer rates of 500MB/second are already available, and terabyte/second rates are projected in the next two years. Storage management ISVs such as BMC, Boole & Babbage, Compuware and Sterling Software will make product acquisitions to support these newer technologies through 1998, with hardware vendors such as EMC and IBM providing built-in storage management functionality and connections to their respective software-based capabilities.

Uniting Enterprise Data Center Technologies



Source: META Group

ASSET MANAGEMENT

Enterprise asset management (EAM) is defined as the establishment of core competencies around the other nine principles. In addition to providing tools and procedures to support various EAM disciplines (e.g., configuration management), tomorrow's data center must be built on a foundation of tech-



nology that is leveraged (e.g., two to three major vendors, with a focus on technologies that maximize synergy and provide economies of scale), while providing scale and manageability. These strategic vendors must also provide technology that lends itself to achieving investment protection, longevity, financial benefit and a toolkit to enable EAM rigor.

EAM tools have emerged from systems vendors, ISVs, help desk vendors, LAN management vendors, service vendors and those with a specific asset focus. These tools all enable different tasks and disciplines, ranging from inventory collection and reporting to higher-end analysis of the asset portfolio. While each EAM constituency prioritizes criteria differently, the key factors include asset clustering capabilities, data mobility (e.g., flexible import and export), and a solution to the lack of a primary key (i.e., unique identifier) for individual assets.

The CIO is the ultimate customer in need of asset management information. In evaluating tools, IT must balance func-

tional vs. financial requirements. Solutions such as HP's AssetView, Asset Software International's AssetPro, Tangram Asset Insight, Comdisco's Class and Isogon's SoftAudit

track the financial side of the house (maintenance and service costs) as well as much of the functional side (hardware/software configuration, inventory management, etc.). ♦

BOTTOM LINE

Since most data center architectures are evolutionary, IT must provide support for at least three platform pillars: OS/390, Unix and NT. IT's challenge in the next 3-5 years is to develop an adaptive architecture, one that includes selecting key vendors with similar goals in providing adaptability and integration during this transition.

Database (and data) challenges will continue to plague IT and vendors. Vendors will lead the charge with architectural "bridges" such as Oracle's NCA and IBM's DB2/UDB strategy with associated middleware linkages. For IT, understanding the advantages of integration among hardware, software, database and network technologies will determine the appropriate vendor alignment and will help resolve corporate "how and where" hosting decisions for new

and existing applications.

IBM will maintain its hold on the back office while reinventing OS/390 to provide some front- (and middle-) office capabilities. Microsoft continues its NT juggernaut; the NT/Merced platform will likely prevail as the standard bearer for network computing, despite Microsoft's inclination to focus on SMP and MPP with its Wolfpack offerings.

Meanwhile, little has been done to address middle office requirements (a notable exception is Sequent's NUMACentre 2000 initiative), leaving the main responsibility so far to IT organizations. In the next 3-5 years, IT must develop partnerships and alliances with vendors who can agree on common middleware and flexible architectures... which ensure bullet-proof enterprise capabilities for customers.

Bruce Allen is Vice President, Enterprise Data Center Strategies for META Group, Inc., an independent market assessment company that provides research, analysis, and advisory services regarding information technology developments and trends. For more information, visit www.metagroup.com.

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T&E expense management under control.

For companies looking to reduce their T&E costs and automate processing, several software options exist that replace the tried-and-not-so-true system of having employees scrawl their expenses onto indecipherable expense reports, shuffle the reports to the accounting department and then wait a month or longer for a reimbursement check.

Software players in this market include American Express Co., Captura Software Inc., Gelco Information Network Inc. and Portable Software Corp. Most have developed client/server applications that allow the basics of processing expense reports to happen online. For example, Portable Software of Redmond, Wash., has developed a client/server application called Xpense Management Solution (XMS). Employees enter expenses in any order; XMS handles the calculations. Expenses charged to a corporate credit card are automatically entered into the traveler's report because of XMS's partnerships with those companies. Then the expense report is sent by e-mail for online approval, processing and payment. Reimbursement can occur within 48 hours.

Chris Selland, research director of enterprise applications for The Yankee Group in Boston, emphasizes the importance of expediting expense processing. "It's hard to get field help these days," he says. "Faster reimbursement is one way to keep them happy."

But by far the biggest benefit to automating is saving hard cash, Selland says. According to Travel Expense Management, T&E reengineering can reduce the cost to process a payment

Executive Hiring

Reeling In Big Fish Gets Tougher

EVERY STARTUP COMPANY needs money; high-tech startups need lots of it. One way to ease the task of nailing down venture capital backing is to sign up a big-deal CEO with a proven track record and a recognized name. But a recent survey found that the odds of landing such a big fish are slim indeed. About one in 30 high-tech startups pulls it off, according to data from the

executive recruiting company Christian & Timbers of Cleveland. The company queried 141 venture capital organizations and 317 emerging high-tech companies to see how likely startups are to reel in a "marquee CEO," whom **Jeffrey Christian**, president and CEO, describes as "someone who has clearly made a mark for [himself] with a visible company—whether through rapid growth, a turnaround or a specific successful product." Unfortunately for the next aspiring Microsoft, Christian says, too few high-profile executives are available for the many new companies trolling for them.

"There aren't enough CEOs to go around. Every successful [startup] may spawn 20 more companies," he says.

So how to bait the hook? Basically, Christian says, you have to spend money to get money; a marquee CEO does not come cheap. Signing bonuses in the million-dollar range, loads of stock options and/or granted (completely free) stock are common enticements. "People move because of significant opportunities," he says.

Of course a big name does not guarantee success. Jim Manzi's now-defunct Nets Inc. is a case in point. ■



LTV Steel Company

LTV Steel Company ROI=16,995%

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ROI=16,995%

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A recent International Data Corporation (IDC) study of organizations that have implemented data warehouses reveals an average three-year Return on Investment of 401%!

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LTV Steel Company ROI=16,995%

As the third largest steel operator in the U.S., they've been using SAS software for data warehousing since long before the term was coined. According to Senior Statistician Robert Scharl, "SAS software is THE element of our data warehousing solution. It beat everything else for data retrieval...and it would have cost us maybe a half million dollars to bring something else in for a data warehousing system."

Phillips Petroleum Company Norway ROI=151%

As a leader in the high-stakes oil and gas industry, Phillips Petroleum relies on its SAS Data Warehouse for an up-to-date picture of company health and safety trends. "With the help of data warehousing, we have an overview of all the 'criticality' factors involved in the daily operation of oil producing platforms," says Incident Analyst Pål Navestad. "In addition, historical data makes a great contribution to cost-efficient design and redesign of our facilities. This knowledge tells us which preventive measures are most effective for increasing revenue and profitability. Quite simply, our SAS Data Warehouse helps to reduce injuries and saves money."

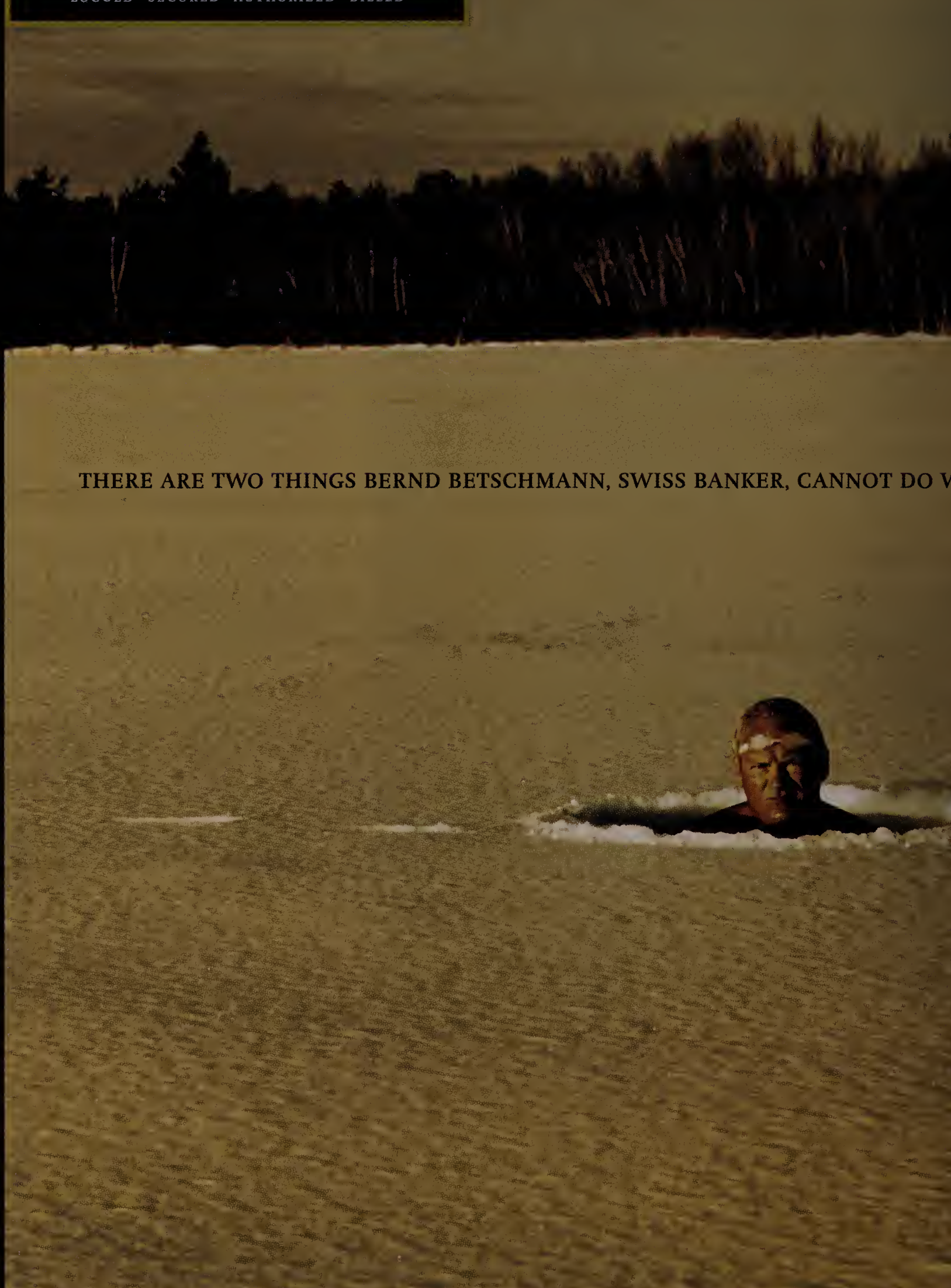


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Other advantages to automating include freeing up accounting personnel to focus on tasks other than tracking down missing receipts or dealing with data-entry errors. By storing T&E data in a database, companies can better identify T&E spending trends and improve budget decisions. That puts your travel manager in a stronger position at the bargaining table when negotiating rates with hotels, airlines and car rental companies.

Portable Software, along with others, is also working on an intranet version of XMS that will give companies further flexibility to automate and streamline their T&E expenses.

—Todd Datz

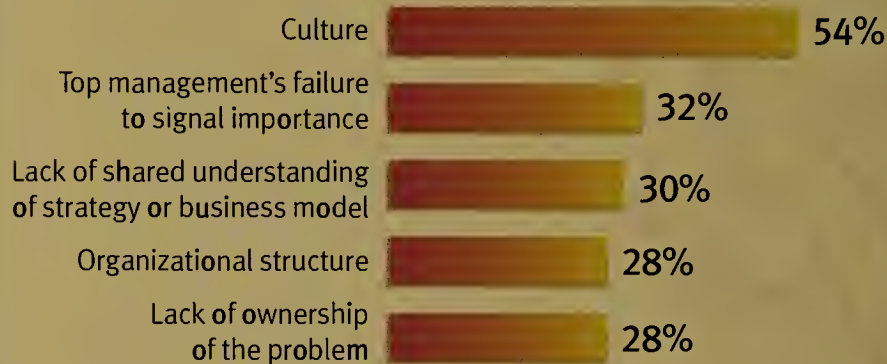
Knowledge Management

Do As I Say, Not As I Do

THE BAD NEWS IS THAT YOUR COMPANY PROBABLY DOES POORLY AT MANAGING its intellectual capital. The good news is that everyone else is so bad at it, you're probably not far behind the pack. Those insights are from a recent study by the Ernst & Young Center for Business Innovation and

Do You Know How to Share?

Top five reasons why knowledge sharing doesn't happen in companies:



SOURCE: ERNST & YOUNG SURVEY OF 431 ORGANIZATIONS

Technology Tools

Personal Protection

NEEED MORE FIREWALL POWER? IF YOU HAVE mission-critical or top-secret information on your workstation (or if you're just hackerphobic), two firewalls might be better than one.

FireWall/Plus for Windows NT Workstations allows one machine to be individually protected from outside log-ons. The software can run with or without network firewall protection, says **David Wilbanks**, product manager for New York City-based Network-1 Software and Technology Inc., which makes the product.

"A senior-level executive's workstation is where some of the biggest threat is," Wilbanks says. "A hacker going for fun might not target that particular machine, but in some of the biggest espionage hacking cases, those [workstations] are prime targets."

The software will be available for PCs running Windows 95 in the first quarter of 1998. For more information about FireWall/Plus, visit www.network-1.com or call 800 638-9751. ■

Business Intelligence, which found that most companies squander the opportunity for competitive advantage that excellent knowledge management would provide.

The study, "Executive Perspectives on Knowledge in the Organization," garnered responses from 431 executives across a variety of industries from manufacturing to entertainment. Sixty percent of respondents hold senior management titles.

A whopping 87 percent described their businesses as "knowledge-intensive," or a place where employees' knowledge is essential to the company's success, and cited multiple kinds of knowledge crucial to their companies' competitiveness—knowledge of customers, best practices and core competencies, for example. General manufacturers place no less importance on knowledge than do other industries, according to the report. However, only 13 percent rate their companies as "good" or better in internal transfer of knowledge. Similarly, just 19 percent are effective at "facilitating knowledge growth through culture and incentives," whereas 44 percent rate themselves as poor (or worse). Further, current knowledge management efforts apparently tend not to focus on the most important benefits. The study's respondents rate innovation as the biggest potential benefit but say efforts to date have centered around efficiency.

But enough about the problem. The study suggests several pieces of the solution. Appropriate metrics for knowledge management, "revenue generated by new ideas," and proper project prioritization ranked as most useful. Intranets are commonly underway already, while "mapping sources of internal expertise" is high on the list of future undertakings. Respondents are divided on whether hiring another executive for mahogany row is part of the answer; 45 percent of respondents say that a chief knowledge officer would be "not at all valuable," while 23 percent say a CKO would be "very" or "extremely" valuable.

—Derek Slater

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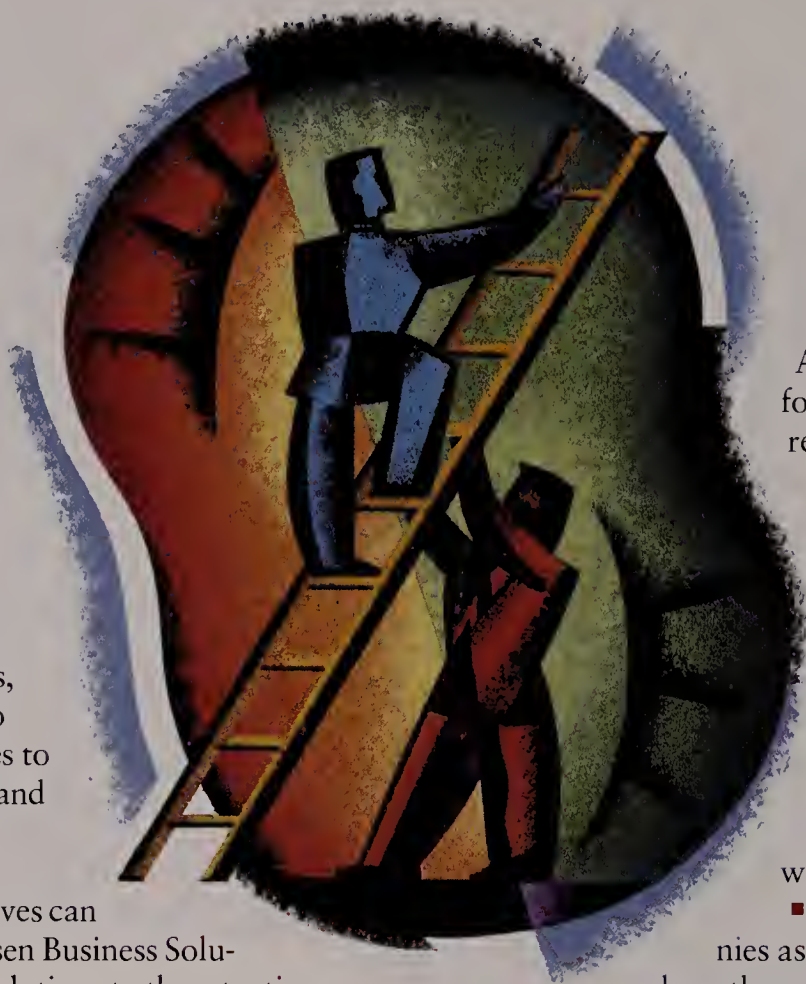
Staff Retention

Repair the Welcome Wagon

IN THIS ERA OF HIGH turnover in information systems (IS) departments, what is the secret formula to persuade valuable employees to stick around? Stock options and so-called golden handcuffs? Bonuses galore?

Though monetary incentives can help, a recent Arthur Andersen Business Solutions study points to other solutions to the retention problem.

Looking at 3Com Corp., Levi Strauss & Co., Ford



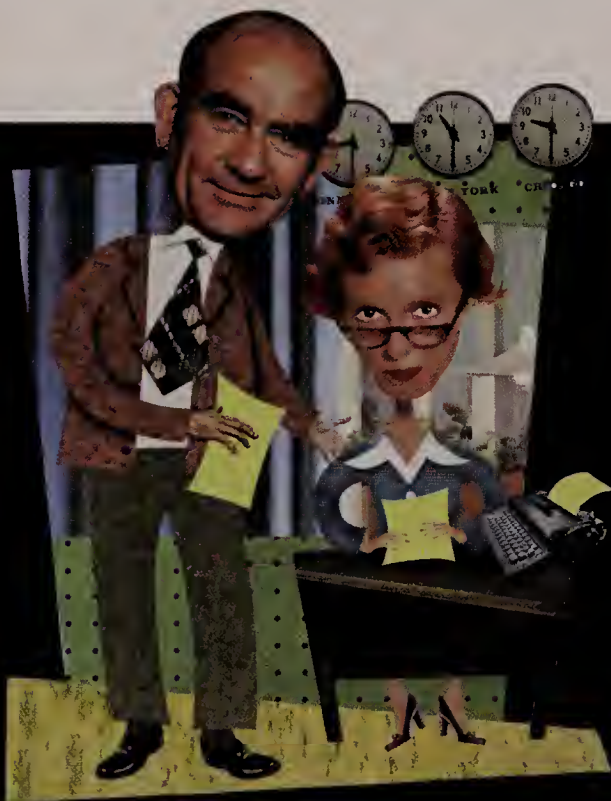
Motor Co. and others, Arthur Andersen LLP found that the following tactics consistently reduced turnover rates:

- **High-quality orientation program.** Devising a solid welcome to a company was chief among issues that promoted career development. Staggering an employee's initial orientation showed good results and reduced the information overload that comes with starting a new job.

- **Buddy system.** Some companies assign new hires a "buddy" to show them the ropes.

- **Give employees a stake in their peers' development.** Establishing a personnel development committee with rotating membership also showed promise.

Arthur Andersen notes that other departments in the enterprise that are less obviously linked to the core of the business, such as financial and legal, also experience high turnover. ■



Office Wasteland

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SO YOU'RE INTERESTED IN BOOSTING the productivity of your harried but faithful administrative assistant? Take a hike.

According to a Sprint Business survey, 53 percent of administrative assistants said they are more productive when their bosses are out of the office. Moreover, you should take that hike in the morning, a time that 76 percent of AAs describe as their most productive.

Given a list of TV characters to choose from, many of the AAs surveyed likened themselves to Jane Hathaway of *The Beverly Hillbillies* (38 percent). A few (2 percent) said they most resembled Mr. Waylan Smithers from *The Simpsons*.

A good number (49 percent) of the same group likened their bosses to Lou Grant from *The Mary Tyler Moore Show*. Other comparisons included Larry Tate from *Bewitched* (20 percent), Alan Brady from *The Dick Van Dyke Show* (18 percent) and Mr. Moony from *The Lucy Show* (13 percent).

No respondents compared their bosses to Murphy Brown. Those poor souls had already been fired. ■

We Goofed

IF A PICTURE IS WORTH A thousand words, this could be a very long correction.

"Smooth Operators," our Oct. 15 story on The Gillette Co.'s global business process integration project, featured a photo of a brand of pens not made by Gillette. Gillette makes Parker, Paper Mate and Waterman brand writing instruments.

We apologize for the error. ■

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Happy Days 2000

Problem? What problem?

BY DEREK SLATER

CONTRARY TO ALL THE DOOMSDAY PROPHECIES, the dreaded "year 2000 problem" is the best thing that ever happened to the corporate information systems (IS) function. Mind you, it won't be great for the unfortunate few whose accounting systems bomb when those last seconds of the 1900s tick away. Nor will their customers find happiness, especially if the unfortunate few we're talking about are banks. For them, there will be the proverbial weeping and gnashing of teeth.

Most companies, though, will ring in the millennium without catastrophe. And benefits of the year 2000 shakeout, commonly referred to as Y2K, will be with us for a long time to come.

First of all, Y2K has raised the profile of information technology (IT) on mahogany row. An A.T. Kearney Inc. survey this past summer found that four out of five CEOs and other non-IT executives see the year 2000 as a business problem, not merely a computer problem. That's a good thing. Those CEOs are now demanding regular reports on cleanup progress. Furthermore, Kearney Vice President Joel Goldhammer says Y2K rescue efforts are enterprise-wide by necessity, and once CEOs see the benefits of getting all their business units on the same page, they'll never want to go back to decentralized chaos. To be fair, IS had a hand in creating that chaos, says Goldhammer. "The IT guys don't want to talk to the CEO any more than [he or she wants to talk to them]," in some cases because IT managers aren't willing to loosen their grip on the reins, he says. But now that conversations are underway, both parties will be better able to get IT and business goals to promenade and do-si-do.

If the board of directors has no interest in or knowledge of the possibilities afforded by technology, then IT will never be

anything more than plumbing. Y2K is demanding their attention. Ultimately, everyone will benefit because that attention will bolster the bottom line. "Now the executives have an appreciation of what kind of information the IT guys need to make the right decisions," Goldhammer says.

The second enlightenment afforded by Y2K is that it finally gives IS executives a financially compelling reason to figure out what the heck systems their company uses. The truth is, at many companies IT is like Uncle Harry's attic—who knows what's kicking around up there? Some of it has real value; other stuff is just junk. Metrics guru Howard Rubin surveyed high-level IS types last year and found that a third of the

respondents had no idea how big their application portfolios were, and 60 percent didn't know how their time would be divided between new development and maintenance in a year. Um...hello? Rocketing sales of asset management software also suggest that many are scrambling to keep track of the thousands of PCs and Hewlett-Packard LaserJets they've spent the past decade installing. Together, these situations suggest too many are flying by the frayed seat of their cable-n-Cobol-patchwork pants.

Rubin calls Y2K "the great cosmic cleansing." He also compares it to a sort of technological Darwinism for IS,

weeding out those unfit for survival. "If after the year 2000 you don't have the information to run your operation professionally, you're out of business," Rubin says.

Fortunately, most will get that information. Nothing like a crisis to get everything running smoothly. **CIO**

Senior Writer Derek Slater can be reached at dslater@cio.com. Responses to this column, or suggestions for future topics, can be sent to reality@cio.com.



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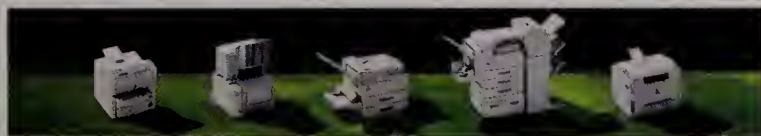


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The Knowledge Biz

*A review of the menu of software and services heating up
the knowledge management kitchen*

BY TOM DAVENPORT

KNOWLEDGE IS THE MARKETER'S DREAM word—much more appealing than data or information. It sounds sophisticated, New Age and expensive. We're already seeing the term used to promote everything from furniture (Steelcase) to newspapers (*The Wall Street Journal*) to drugs (Eli Lilly). It won't be long before every database, application package, server and even peripheral vendor will be linking their products to knowledge. Prepare for the onslaught now by setting your antihype phaser to "neutralize."

But if you're thinking about how to make money from knowledge management (KM), you don't have to wait for examples. Software and services firms are already selling tools and capabilities guaranteed (well, intended anyway) to assist in the management of knowledge. The action is hottest in certain software segments, services are heating up, and before long the knowledge kitchen is going to be so superheated we'll all want to get out.

Knowledgeable Software

LET ME BE FRANK: A comprehensive software solution to the problems of managing knowledge does not yet exist. All vendors currently offer only partial or niche solutions. Perhaps someday there will be an SAP of knowledge management (and perhaps it will be SAP—just plug in that KM module alongside finance and materials management), but there isn't today. If I were at IBM/Lotus, Microsoft or maybe Netscape, I'd be acquiring knowledge-oriented software pieces to string together a broad solution. Such a solution would include four key components.

Storage and distribution. Because Notes/Domino and Web tools are the knowledge distribution engines of choice, the

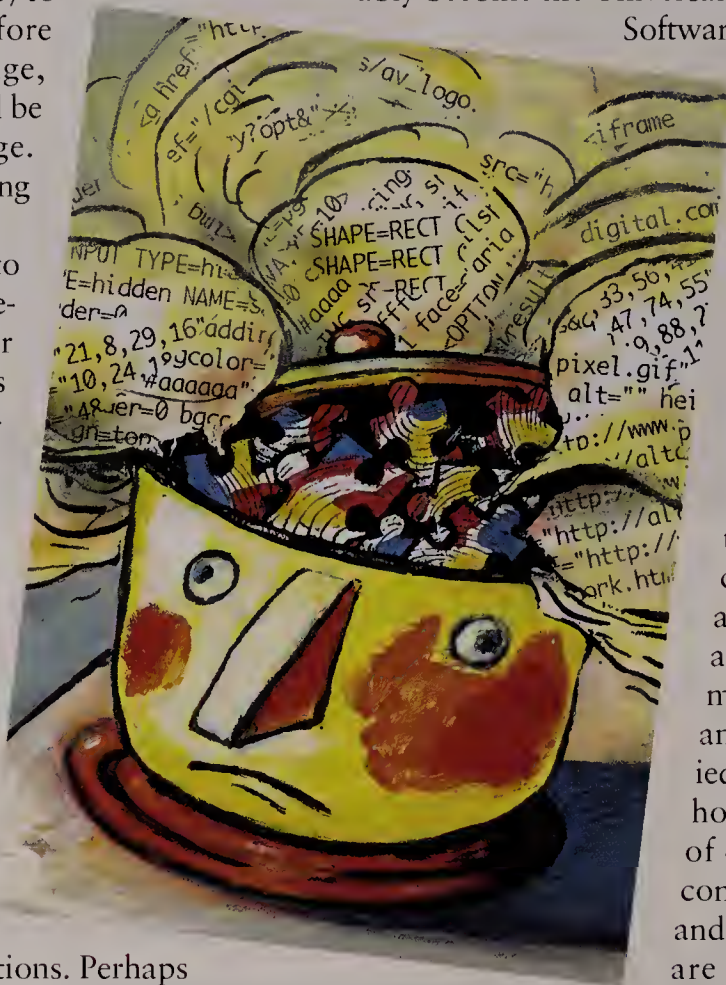
companies that provide them are likely candidates to pull everything together. Both offer not only distribution but also discussion database capabilities. But look for knowledge to be increasingly stored in general-purpose, not knowledge-oriented, databases. Oracle Corp.'s Universal Server will probably become the Universal Knowledge Server, and Informix

Software Inc.'s Data Blade will become the Knowledge Blade.

Search. The search tool companies are already heavily into knowledge-oriented marketing. Verity Inc., Fulcrum Technologies Inc. and Excalibur Technologies Corp., the leading search tool firms, describe themselves as KM companies. Trouble is, none of these companies is making money—search has become a commodity—so they can't pull together any broad knowledge capability. They are all working on approaches that would let users create an unstructured query against multiple types of data, information and knowledge from sources as varied as textual databases, data warehouses and photo galleries. Vendors of other capabilities with a search component, such as Inference Corp. and Teltech Resource Network Corp., are also seeking this "multicontent meta-search" grail. Most of these firms

worked with the University of Massachusetts at Amherst's Center for Intelligent Information Retrieval on a research project in this area, and now they're all hard at work on product development. Sovereign Hill Software Inc. and Knowledge Discovery Systems Inc. are search upstarts that may come up with something big; Perspecta Inc.'s SmartContent tool, which enables visual navigation of content, looks promising.

Agent or profiling technologies are search tools that have



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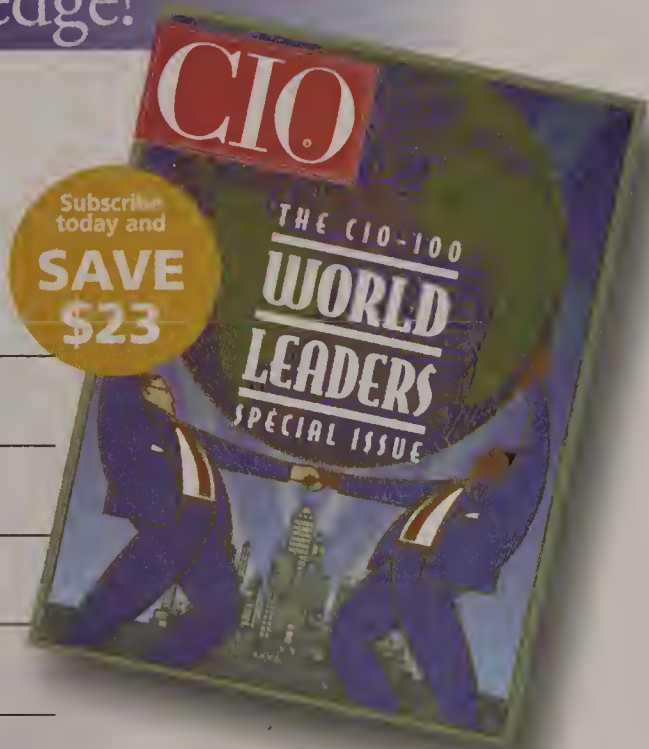
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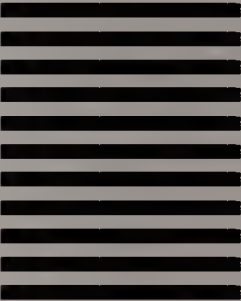
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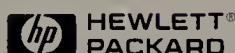


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hit the market ahead of the demand. From GrapeVine at the high end to Web push tools at the low end, these products require the user simply to describe the search terms that will later be applied to various content sources. I expect that virtually all search tools will eventually incorporate profiling and push capabilities. Search results will also be augmented to indicate how many other people with similar interests sought the information and found it useful. If First Virtual Holdings' Firefly can do this with movies and records, someone else can do it with information sources. Imana Inc. is already offering a form of such "collaborative filtering" based on common Web browser bookmarks.

Analysis. There's a fine line between search and analysis because search itself involves semantic, statistical and other forms of analysis. But by analysis, I mean turning numbers and raw text into something of value. In the realm of text, the traditional expert systems or artificial intelligence (AI) vendors are virtually extinct, but there are still-thriving pockets of AI-based approaches. Inference dominates the case-based retrieval market and is trying to expand beyond the customer support arena. KnowledgeX, which analyzes relationships between different sources of text and creates a visual relationship structure, is trying to break out of the competitive intelligence niche. Many other types of analysis that focus on quantitative data—such as data mining and visualization tools, Bayesian modeling and neural networks—are increasingly falling under the KM umbrella. Such numeric tools attempt to "turn data into knowledge." Like text-based tools (and despite the hype), these still require very bright and analytically inclined humans to take advantage of them.

Content. I know, content isn't software, but it is increasingly being enhanced by software. New companies, such as Digital Knowledge Assets and DigitalThink Inc., are packaging knowledge (articles, books, case studies, even business school

courses) and combining it with Web software for distribution to clients. Several consulting firms, including Arthur Andersen (AA Knowledge Products) and Ernst & Young (Ernie), are dispensing the knowledge of their professionals over the Internet through both pull and push technologies. They're trying to find something to sell other than hours, which are inherently limited.

Servicing Knowledge

STILL, A NUMBER OF PROFESSIONAL services firms are peddling hours in the area of KM. With reengineering virtually dead, the ERP market almost saturated and year 2000 projects approaching a natural end, it's the hope of many a company seeking The Next Big Thing.

But the knowledge services market isn't booming at the rate of, say, reengineering in its heyday. Many firms are hanging back before making a full investment in people and methods. The problem is that most KM engagements simply aren't big enough yet to make a Big Six (or perhaps I should say Big Five) partner salivate. The number of engagements is clearly increasing, but most are still below half a million bucks. If you're trying to decide whether to sell your client an ERP job or a great KM system for new product development, odds are you'll go for the project that will blast through your quota. Therefore, I believe the Dataquest projection of a \$3.6 billion knowledge management services market in 1998 is extremely dubious. Gartner Group (which, curiously, also owns Dataquest) projects a more likely \$300 million to \$400 million.

Ask a KM consultant what you need and you are likely to get the inverse golden rule: "Let us do unto you as we have done unto ourselves." Many clients, upon seeing the impressive KM initiatives that consultants have created internally, want the capability more or less replicated in their own organizations. Those who want massive Notes repositories, for example, would be well advised to consult with firms such as Andersen Consulting, Arthur Andersen, Price Waterhouse and IBM/Lotus Consulting,

all of which have built them internally. If you want a Web-based knowledge infrastructure, you might chat with Booz, Allen & Hamilton or KPMG Peat Marwick. If you're interested in building a system to manage a network of internal experts, Teltech has built its own business around a network of external experts. If you need a well-crafted knowledge library and a community of knowledge contributors, American Management Systems and Ernst & Young have just the ticket. The converse of all this internally derived expertise is that you should avoid asking companies to do things that they haven't done internally.

Virtually every consulting firm will tell you that its KM methodology is a mixture of "people, process and technology." (Funny, they said the same thing about reengineering.) Since most of the major firms have a knowledge management practice and very similar approaches, you might want to select among them on the basis of their ancillary competencies. For example, if your KM project will need a heavy dose of strategy, think McKinsey or Booz, Allen. If your effort includes a huge systems integration task, you should gravitate toward IBM, Andersen Consulting or Ernst & Young. Renaissance Solutions provides a balance of KM and performance measurement; Arthur Andersen has a strong mix of knowledge orientation and best practices management.

Remember, you're hiring not a firm but a few individuals. The KM expertise in most consulting firms is still spread rather thinly. Make sure you get the KM credentials of your engagement team, not just those of the entire firm.

With both software and services, beware of old wine in new bottles. I've seen process modeling, e-mail and project management software "repurposed" as KM tools, and reengineering, groupware and IT strategy consultants retreaded as knowledge management experts. Look for evidence that both software and services are truly knowledgeable about knowledge. **CIO**

Thomas H. Davenport is a professor and director of the Information Management Program at the University of Texas at Austin. He welcomes reader comments at davenport@mail.utexas.edu.

By Definition

Knowledge Management:

a systematic attempt to create, gather, distribute and use knowledge



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Speed!

Chasing the record for speed is part of the culture at Honda of America. It also happens to make good business sense. **BY JENNIFER BRESNAHAN**

From the minute associates at Honda of America Inc.'s Marysville, Ohio, plant get dressed for work in the morning, they are primed for speed. Every employee, including President Takeo Fuki, wears a white uniform much like those donned by race car drivers and their teams down to the red name patch above the heart. If a problem should arise, the uniforms free associates to rush out in the rain or climb under a car to fix it. No wait, no fuss, just immediate action.

This pit crew approach epitomizes the overall philosophy at Honda of America, a company whose entire identity is wrapped up in speed. Back when the Big Three automakers were still taking 72 months to develop a new model, Honda slashed its development time from 60 to 24 months. Today its competitors are getting faster, but Honda continues to push the benchmark for efficiency, recently developing a new V6 engine in two years instead of the industry's customary three, for example. And the company has done it again with its rigorous development and manufacturing schedule for the '98 model Accord. Honda got its new model into production in record time without sacrificing quality, says Dave Nelson, senior vice president of purchasing and corporate affairs for Honda of America Manufacturing.

Where does that thirst for acceleration come from? Obviously, Honda's penchant for doing things fast garners bottom-line benefits: The more the company reduces cycle time, the less its engineers, production facilities and capital

Reader ROI

LONG A MASTER AT WIELDING SPEED AS a competitive weapon, Honda offers valuable lessons in ways to cut cycle time without sacrificing quality. Readers will learn

- ▶ How speed bolsters the bottom line
- ▶ How Honda's customer-focused corporate culture translates to speed and efficiency
- ▶ How empowered employees and suppliers contribute to cycle time reduction

A photograph of two men, Ron Shriver and Charles Allen, dressed in white racing suits. Ron Shriver, on the left, is holding a large black and white checkered racing flag. Charles Allen, on the right, is holding a clipboard and a small object in his hands. Both men are smiling and appear to be on a racetrack. The background shows a blue sky and a dark fence.

VPs Ron Shriver and Charles Allen: Honda's racing mentality helped get the '98 model Accord off the drawing board and on the company's racetrack in record time.

equipment are tied up. And because design and manufacturing improvements in the '98 model let Honda shave 20 percent off development costs and a healthy chunk off the cost of producing each Accord, shifting production to its new model faster meant that Honda could begin reaping the profits that much sooner.

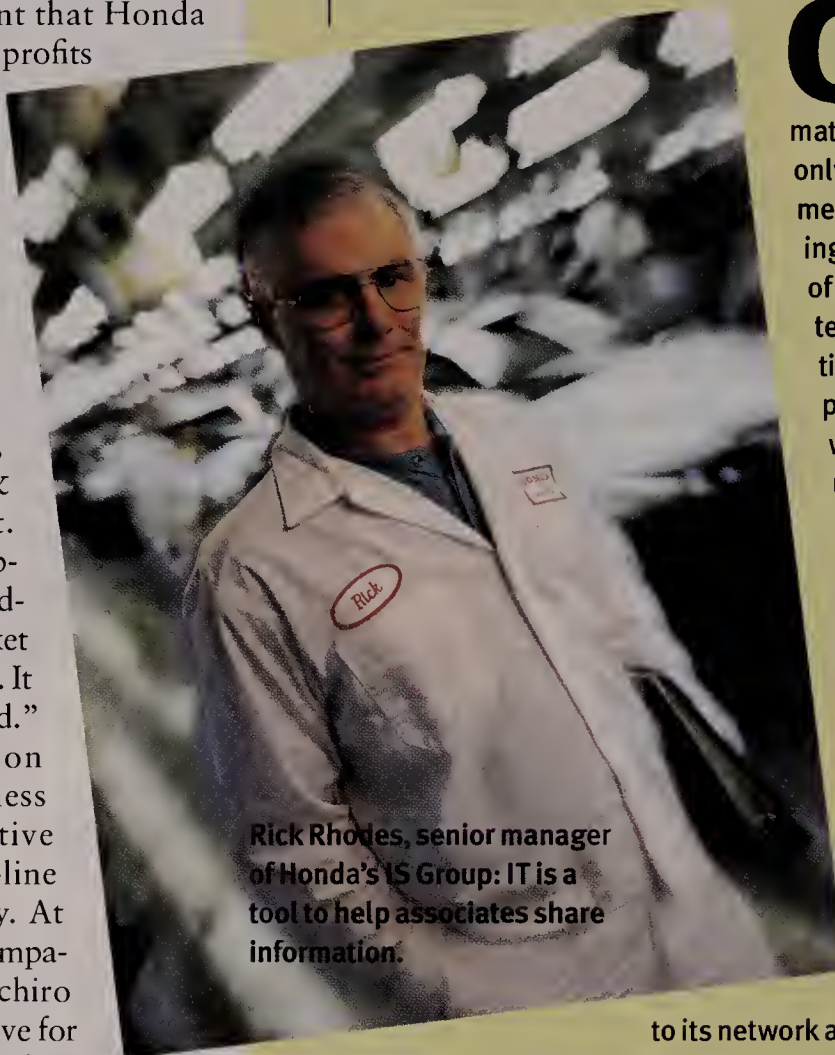
Speed also scores points in the marketplace. "If you can get to market with a better product quicker than anyone else, that's what the customer is going to buy—your market share increases," says Bill King, a partner with Ernst & Young LLP in Detroit. "And you establish a reputation for bringing good-quality products to market quicker than anyone else. It helps to build your brand."

But the real reason behind Honda's swiftness goes beyond competitive pressures and bottom-line returns, employees say. At Honda, speed is in the company's genes. Founder Soichiro Honda had a personal love for motorcycle and race car driving and pushed his young company to produce motorcycles and race cars that took the racing circuit by storm. That obsession with speed has been passed down to today's Honda employees. Now, what Nelson calls Honda's "racing spirit" is seen in the way Nobuhiko Kawamoto, president of the \$42.6 billion parent company Honda Motor Co. in Tokyo, tinkers with race car engines in his spare time. Or in the employees' enthusiasm for company-sponsored racing events, such as a recent visit to the Marysville plant from Indy race car drivers who answered questions and signed autographs.

For Honda employees, speed is more than just a competitive goal; it is a personal value. By cultivating that fixation on fleetness and nurturing its employees' sense of personal contribution to being swift, Honda of America has become one of the world's fastest and most effective organizations.

A Back-Seat Driver

At Honda, leading-edge IT purposely takes a back seat to corporate values



Rick Rhodes, senior manager of Honda's IS Group: IT is a tool to help associates share information.

COMPANIES LOOKING TO EMULATE Honda of America Inc.'s swift nature might be surprised to learn that information technology (IT), while important, plays only a supporting role in Honda's accomplishments. "Our approach in IS is not to be leading edge," says Rick Rhodes, senior manager of the Information Services Group. "New technologies come out on the market all the time, but many are not really ready yet. If we pick something based on marketing hype, we'd waste a lot of time supporting that product or making it work as it should. If it makes good business sense, then we'll do it."

IT is mainly just a tool to help associates share information with coworkers when face-to-face contact isn't possible. Designers, for example, build 3-D models of the vehicles with CATIA, a computer-aided-design tool from Dassault Systèmes, and then post the drawings on Honda's network where they can be downloaded and commented upon by engineers in Japan or across the state at Honda's engine manufacturing facility. Honda also gives suppliers access

to its network and CATIA database so they can keep track

of the latest changes and how they affect their own work.

Because Honda believes so heavily in the abilities of its associates, it eschews technologies that try to replace them. "We have the same tools that other manufacturers have but may use them a little bit more selectively," says David Marshall, senior systems engineer for Honda R&D. For example, Honda hasn't bought a million-dollar vision robotics machine like those used by other automakers to digitize images for prototyping; the company figures technology in general is fundamentally unreliable and its engineers can come up with better solutions on their own. "We could get the same effect with intelligent design," says Honda R&D Chief Engineer Charles Baker. "It's how we interact with that technology and how we go the extra mile to consider the customer that keeps Honda Honda."

—J. Bresnahan

Maintaining the Pace

A KEY ELEMENT TO SUCCESS IN THE racing world that Honda has adopted as its own is a fanatical obsession with keeping schedules. "When a race starts, if you're in the garage or still pushing your car out, nobody's going to wait for you," explains Charles Allen, Honda R&D North America Inc. vice president and general manager.

The research team began preplan-

ning for the '98 Accord in early 1993, before the '94 model—the previous full-model change—was even released. The manufacturing schedule for the Accord, which began full steam on Aug. 19, 1997, was set two years in advance. "That was the race," says Ron Shriver, Honda of America's vice president and auto plant manager in Marysville. "Everything before that date was just getting ready for the race." The com-

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pany also declared that on Sept. 25, just one month after production started, every one of its 1,000 North American dealers would have enough of the new Accords in stock to satisfy demand. That's 30,000 cars in three weeks, instead of Honda's customary 10,000 cars in the same time, says Shriver.

All this despite the fact that up until the very production date of the '98 Accord, the '94 model was the public's top pick of cars in its class—not to mention that J.D. Power and Associates of Agoura Hills, Calif., had recently named the Accord and Odyssey best cars in initial quality in their categories and proclaimed the Marysville plant the highest-quality automotive plant serving the U.S. market. "[The Accord's popularity] puts extra pressure on us," says Shriver. "Typically with a new model launch, your customer knows it's coming and the press knows, so the last few months tail off. [In July], the Accord was the number-one selling car, which is very rare. Most companies would probably delay the launch of the new model, but not Honda. We've got a deadline and we're sticking to it."

Why go through so much trouble for already satisfied customers? Honda, like most car makers, updates its car models roughly every four years to correspond with the average length of time most consumers own their cars. If Honda doesn't have something new to offer, ready-to-buy consumers will go elsewhere. And once the company has promised a new model, it's determined to deliver it on time. "There's nothing worse for customers than to want a product and be told they have to wait eight weeks," explains Timothy D. Downing, '98 Accord engineering project manager.

Treating Employees Like Customers

OF COURSE, SETTING AN AMBITIOUS schedule is one thing, but actually inspiring employees to put in the extra effort needed to meet that schedule is entirely another. Honda motivates its associates by respecting them as individuals—not to mention valued customers. A glance at the miles of Honda-filled parking lots in Marysville bears out the fact that associates are cus-

tomers; in these parking lots, simply remembering that you own a red Civic or a black Accord isn't going to cut it.

But in addition to plunking down cash for the cars that roll off the company's production line, Honda associates are also considered customers of their fellow associates who worked on the

previous piece of the manufacturing or design process. Signs around the plant reinforce Honda's customer focus by reminding associates to ask, "Who's my customer?" and "Is my customer happy?" In the long run, this attitude shaves time from the production schedule. "When we do anything, even

Fast Furnishings

Technology helps Miller SQA deliver office furniture in a hurry

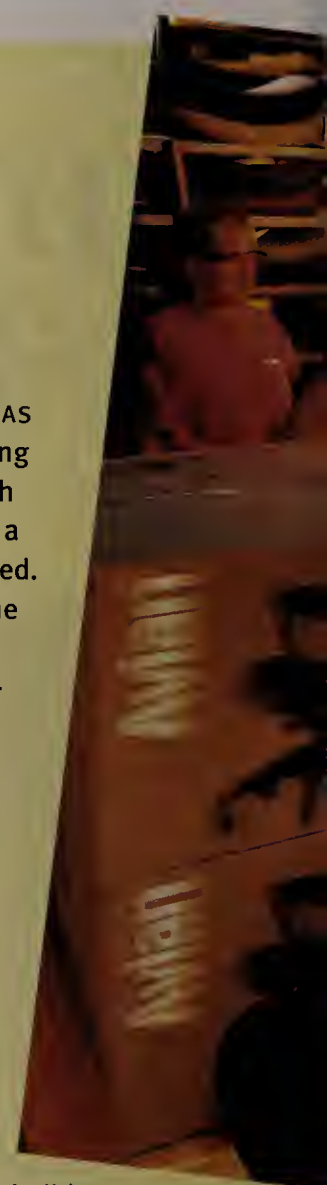
BUYING FURNITURE IS GENERALLY NOT A SPEEDY PROPOSITION, AS anyone who's ever bought a couch or desk can attest. Settling with the dealer and manufacturer on the right fabric or finish for customized orders can take four to six weeks, after which comes a six- to eight-week wait for the order to be manufactured and delivered.

But with the battle cry "simple, quick, affordable," Miller SQA, the service-oriented, furniture manufacturing subsidiary of \$1.6 billion furniture giant Herman-Miller Inc., is out to revolutionize the notoriously slow office furniture industry. Five years ago, folks at Miller SQA's sunlit factory in Holland, Mich., examined its processes and saw that out of the 12- to 14-week cycle, only two days added value to the product. And in this extra time was a golden opportunity to carve out an identity as a speedy, no frills office-furniture source, offering just the basics while its parent company continued to fill the demand for furniture-as-art.

With the help of an aggressive information technology (IT) strategy—Information Systems Manager Jim Von Ins says management "just rains money on IT"—Miller SQA set out to build a business plan that modeled the lightning-fast computer industry. "Dell is our hero," says General Manager Gary Von Spronsen, referring to the \$8.7 billion direct order computer manufacturer that builds and delivers PCs in one week flat. "The computer industry lives in a nanosecond product life cycle, while our product life cycle creeps along over 10 years," says Von Spronsen. "If you watch something happen so fast, you can really learn from it."

Taking a "blimp view" of the manufacturing process, Miller SQA created a Web-based application encompassing every player and component of the process with systems for 3-D design, enterprise resource planning (ERP), expert scheduling, shop floor execution and communication with suppliers via an extranet called SupplyNet, says Application Development Manager Douglas J. Bonzelaar. The first component of the system, ZAxis, helps Miller SQA's salespeople in the field design custom furniture configurations. In the past, salespeople had to be patient; with over 57,000 parts from which to build, a near infinite number of possible combinations of fabrics, colors and sizes and only 2-D drawings to help them visualize, customers often had a hard time making up their minds. The many variables—combined with procedural errors—led to about 25 percent of customers being unhappy with what finally arrived and demanding changes that further clogged the manufacturing queue.

But today, customers can "try on furniture like clothes," says Von Spronsen. Choosing between a two-day or two-week delivery option, customers use ZAxis to experiment with different physical layouts and cubicle configurations and see the



though it may appear on the surface to be an advantage, we think about how it's going to affect customers upstream and downstream," says Rick Rhodes, senior manager of the Information Services Group. "If what I do saves me five minutes but causes the customer downstream 15 to 20 minutes of extra work,

then it's not a good idea."

To promote the idea that individuals are valued as employees and customers, the organization is as flat as the surrounding cornfields that Japanese associates find so jarring: All employees are respectfully called associates, executives enjoy no special parking spaces or din-

ing areas and no employees are allowed to eat at their desks because the associates on the plant floor cannot.

Yet while all Honda associates abide by the same rules and wear the same industrial white outfit, they're hardly Brave New World drones. Individual thinking is very much valued, and everyone, no matter what their rank, is encouraged to speak up. In fact, every individual has the power to immediately halt the production line if he or she notices a problem. Despite the enormous expense of shutting down the line—\$26,000 per minute in lost productivity, according to Nelson—Honda has found that giving associates that authority saves time and prevents more costly delays in the long run.

"The manufacturing industry in general and the automotive industry in particular are not what you'd call warm and fuzzy places to work," says King. "But Honda's principal tenet is respect for the individual. The payoff is people are not afraid to identify issues. It's a very positive, fact-based environment. If issues exist, they identify countermeasures and then they execute without wasting time placing blame." For example, if a problem arises in the paint department, Honda doesn't bother pinpointing the source of the problem. Rather, it immediately encourages associates in other departments to pitch in to fix it. As a result, solutions are generated within one or two days instead of the one or two weeks it takes in more blame-focused companies, says Shriver.

When speed and quality are the goals, such collaboration is critical. "We believe in getting consensus from everyone involved in a process," says Rhodes. "We go to all the affected areas and say, 'This is what we want to do,' and they offer their input. So everyone understands their role and responsibilities when it's time to start. It's not a Christmas morning approach where it's new, bang, and you didn't know it was coming."

The Three Actuals

THE COLLABORATIVE ENVIRONMENT at Honda is a byproduct of the company's emphasis on the Japanese concept of the three actuals—go to the actual place, work with the actual people or



Gary Von Spronsen:
"Dell is our hero."

results immediately in 3-D color. A few of Miller SQA's larger customers have the application in-house and can place orders by themselves. By December, the company plans to make the same capability available to anyone over the Internet.

When a customer's order is finalized, it's transmitted in real-time to the factory, ensuring close to immediate order processing. The information is stored in a Unix-based, Symix ERP system, which coordinates the order through the entire manufacturing cycle. The order goes through a Platinum Technology expert scheduling system, which coordinates and prioritizes the orders according to the customer's time demands, availability of materials and floor capacity. At the same time, SupplyNet automatically sends raw material requests to suppliers via the Web, checking to see if the material is available.

Most orders comprise multiple items that need to be built to specification in different assembly lines. The automated scheduler coordinates these components and creates a master schedule that tells shop floor workers what to do, minute by minute, so they no

longer must rely on a stack of index cards shuffled into an approximate order of priority. As they make their way through the schedule, workers update the status of the order via PCs on the plant floor. If a customer calls, any employee can check the order's status through a Lotus Notes database attached to the ERP system.

The furniture industry is relatively stagnant (about 4 to 8 percent growth), but Miller SQA has grown more than 35 percent over the past five years because of this application, says Bonzelaar. It has cut the company's operating expenses by 10 percent and, in turn, many of its dealers' operating expenses by 18 to 19 percent. But more important, customers who choose the two-day option no longer have to wait 14 weeks for their orders.

Now, problems of an entirely different nature are cropping up for Miller SQA—getting people used to the new time frame. One customer, for example, was unhappy when she recently ordered 12 chairs and then called an hour later to change the color, only to find that the chairs were already boxed for shipment. "If the stars are right, an order could go through the system in two or three hours," says Bonzelaar. "Now that's fast."

—J. Bresnahan

part and understand the actual situation. Although it might seem unnecessary or impractical, adherence to the concept helped facilitate the efficient design of the '98 Accord. When the designers weren't sure whether a part they were designing could actually be welded, for example, they'd drive over to the manufacturing plant to ask a welder directly. A visit to the site about a specific problem not only prevents engineers from becoming detached from the actual process, it often yields insight into a completely unrelated and unforeseen issue, says Shriver.

After a few test cars were produced, the Accord design staff interviewed every one of the 4,000 line associates who worked on the project about problems they encountered and solicited their suggestions for improvements. Though doing 4,000 interviews was very time-consuming, in the end it allowed for faster production. "They helped us find things that we would've missed otherwise," says Honda R&D Chief Engineer Charles Baker. "[Associates on the factory floor] know the process the best. If we can get them involved and give them responsibility to fix problems, we can make a much smoother startup."

The three actuals concept not only saved time, it saved money. While about 20 percent of the new Accord shares parts with the '97 model, the rest is designed from scratch. Yet, because R&D personnel had such close interaction with the plant side, they consciously designed the new model so that it could be assembled using the old equipment. This meant Honda could produce 1,000 test cars alongside the old model and not disrupt the normal production schedule. The tests of the preproduction cars, which began around March, gave the company a chance to make the process perfect. As a result, it was able to go

from zero to full production within just 20 days of the Aug. 19 start date—no small accomplishment when most automakers shut down their plants for two to six months between model changes. Toyota, for example, took



"When a race starts, if you're in the garage or still pushing your car out, nobody's going to wait for you."
—Charles Allen

about 35 days to get up to full production with the '97 Camry, and Chrysler typically takes 75 days, says Ronald E. Harbour, president of Troy, Mich.-based manufacturing consultancy Harbour & Associates Inc. When the stakes are \$26,000 in lost productivity for each minute the plant is idle, the advantages of speed add up quickly.

Getting Suppliers in the Loop

HONDA'S DRIVE TO SHORTEN development time for the '98 Accord didn't stop at the factory doors. The three actuals concept led Honda to rethink the adversarial and unproductive relationships automakers historically have had with suppliers. Most suppliers were used to delivering only a half-developed version of the new product by the day preproduction of test vehicles began. But because Honda wanted to iron out any bugs before full production began

in August, the company required fully developed parts at preproduction. And the only way it could guarantee that its suppliers would be up to helping it produce 30,000 new model cars in less than a month's time was to help them be more like Honda.

Departing from the industry standard, Honda treated its suppliers for the '98 model as valued customers and actively pitched in to ensure their success. No fewer than 900 Honda associates worked every day to help suppliers increase quality, contain costs and develop leading-edge technology. And the associates weren't just holding executive conferences. "When we're out there [meeting with suppliers], we don't want to see somebody in a shirt and tie," says Downing. "We're expecting the associates on the line to show us what they're doing."

In addition, Honda sponsored a guest engineer program in which suppliers' engineers worked side by side with Honda's Marysville associates to design the new Accord. Honda benefited from extra brainpower for innovative model designs. For example, one supplier's idea to make bumpers from a different material resulted in a 30 percent cost reduction per bumper, says Nelson. "Instead of Honda engineers dictating, 'Here's the size and the dimensions of this part and the material we need to make it out of,' the supplier can recommend a slight design change that might shave pennies, dimes, quarters off the cost of making that part," says Rhodes. "Because they know their business better than anybody."

Honda's racing spirit and customer focus allowed it to meet all its deadlines for the '98 Accord while improving quality and cutting costs. "We built the [Accord manufacturing] trial event last week," said Shriver in early August. "The quality of those cars is the highest we've ever achieved, and we're not even in production yet. Usually at this point, we're still trying to tear things apart and make things fit." Now it's just a matter of time before the Marysville parking lots are filled to the brim with shiny new '98s. **CIO**

Senior Writer Jennifer Bresnahan can be reached at jbresnahan@cio.com.

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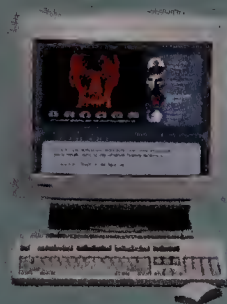
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is Benchmarking Worth the Bother?

Definitely. It won't reinvent your company, but it will show you how to improve bit by bit. **BY DEREK SLATER**

BENCHMARKING WON'T PERFORM A LAZARUS routine on a six-foot-under business model, shave a bazillion dollars from your information technology budget or help the Saints win a Super Bowl. Frankly, if you've already paid a reasonable amount of attention to your work processes, benchmarking won't even provide any shiver-me-timbers surprises, says George Danforth, vice president of total quality management services at Boston's Fidelity Investments Systems Co. "There aren't many real breakthroughs out there if you're already doing things well," he says.

But benchmarking can be a vital cog in the machine pulling a company toward continuous process improvement—and today that reason is compelling enough to benchmark with enthusiasm. "You absolutely have to do it. You can't be a mushroom," growing alone in the dark, he says.

Benchmarking—comparing corporate products and practices with the world's best and then borrowing the work processes that will help close the gaps—has been in the corporate eye since Xerox Corp. manager Robert Camp penned the quintessential book *Benchmarking: The Search for Industry Best Practices That Lead to Superior Performance* on the subject at the tail end of the '80s. It also got a major visibility boost when managers started filling out Malcolm Baldrige National Quality Award applications and found they had to de-

scribe their companies' benchmarking activities.

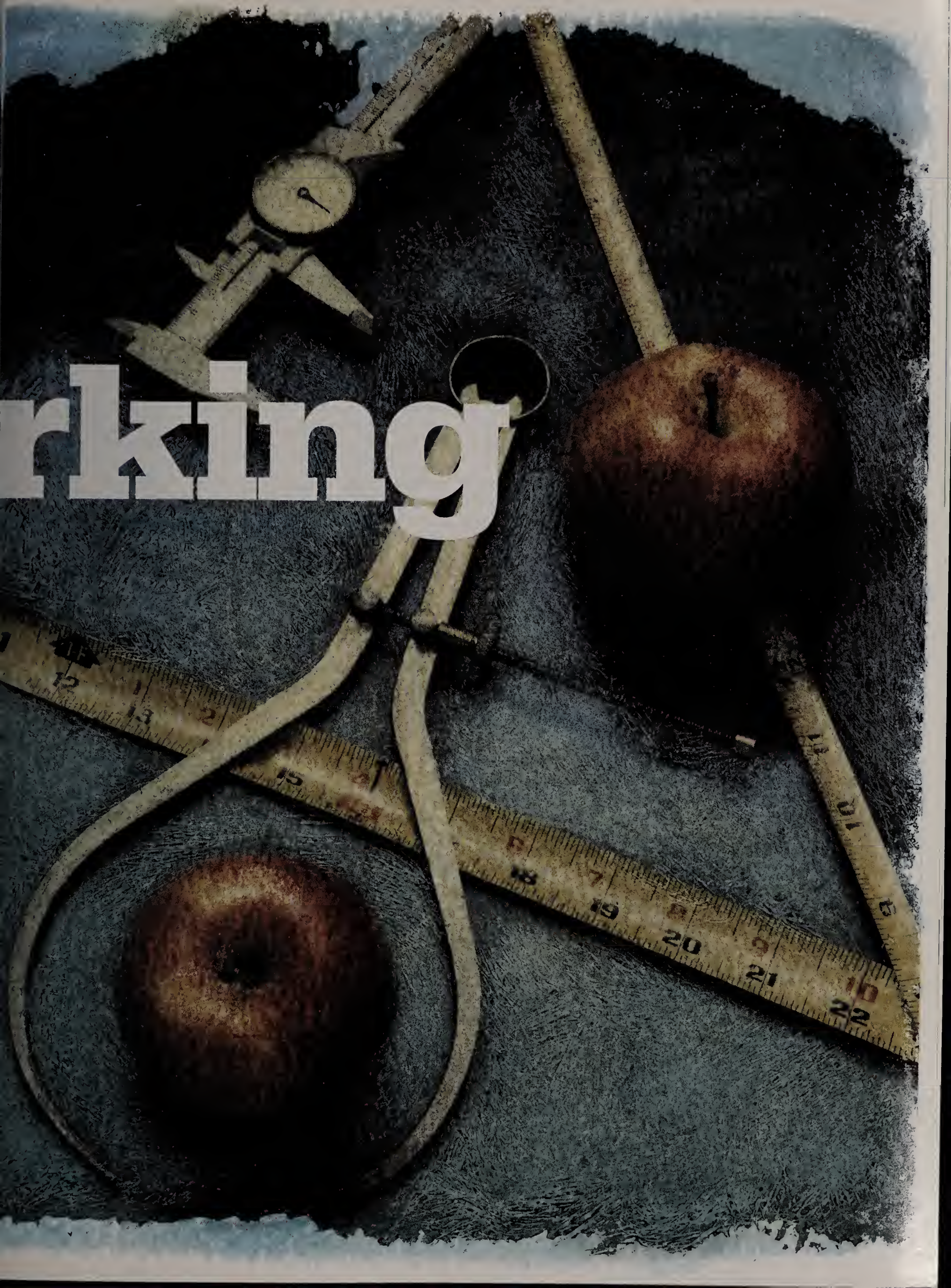
In IT departments, though, benchmarking efforts apparently still labor under a degree of skepticism, according to Howard Rubin, a professor at Hunter College in New York City and research associate with Meta Group Inc. Rubin, who collects quantitative information on business and IT performance and conducts annual surveys of IT organizations' concerns, says top priorities vary over the years, flitting from reducing application development time to, lately, year 2000 readiness. But one constant in the survey is the ranking of metrics: near the bottom of the list. "It's a real paradox," Rubin says. "You can't possibly do anything to accomplish those other objectives unless you have metrics."

Even so, according to Danforth, taking benchmarking for what it is—just a piece of the incremental improvement process—is important. Anyone who finds shocking revelations in

Reader ROI

THINK BENCHMARKING IS all hype and hassle? Not so. This story will help readers

- Find the right companies to serve as benchmarks
- Pick the right processes to measure
- Discover effortless ways to benchmark



rking

the course of trading process ideas has been in the dark too long, he says. Instead of searching for a silver bullet, Danforth undertakes his benchmarking expeditions looking for what he calls "golden nuggets," or incremental process improvements. Danforth ticks off a list of areas where Fidelity Investments Systems has benefited from cooperative benchmarking efforts, including external customer service, joint application development and help desk problem management. He and other IT benchmarking veterans offer the following "golden nuggets" to improve your own benchmarking efforts.

Commit to act on what you discover. If you don't plan to take aspirin or go to the doctor—no matter what the thermometer says—why bother taking your temperature in the first place? Measurement initiatives waste time and money if they aren't backed by commitment to appropriate process change; likewise, site visits to other companies often amount to nothing but "industrial tourism," according to one benchmarking practitioner. Change is the whole point of benchmarking.

Commitment to action is doubly crucial in the IT arena because the best IT benchmarking efforts measure processes that are interwoven with the rest of the business. Obtaining executive support is the first step in most benchmarking methodologies, including the sign-off of any business line managers whose work will be affected. For that reason, benchmarking is most effective when presented as one tool in a process improvement effort rather than as the star of the show.

Companies that place a general emphasis on quality typically have an easier time putting benchmark findings into practice. For instance, Rich Srednicki, president and CEO of AT&T Universal Card Services in Jacksonville, Fla., keeps a close eye on IS operations and enthusiastically supports the business unit's benchmarking efforts in application development, which his predecessor initiated. At Srednicki's behest, AT&T UCS resumed the discontinued process of tracking its progress on the Capability Maturity Model, developed by the Software Engineering Institute of

Carnegie Mellon University. The SEI model ranks corporate development capability on a scale of one to five, with the highest score indicating repeatable, manageable processes. "Generally, when the CEO's behind it, others will be too," says Chris Batchelor, senior manager of decision support systems for AT&T UCS.

Use measures built into IT projects. If a company jumps on every benchmarking bandwagon suggested by zealous proponents, it could wind up spending half the IT budget measuring the effectiveness of the other half.

That doesn't have to be the case, Rubin says, if the benchmarking yardsticks are those already built into the IT processes. "The measures have to be so well aligned with the business strategy that they are offshoots of the process," he says. For example, metrics in the area of application development can include time to completion or the rate of defects found as testing progresses. Both measures are fairly straightforward to record during the course of a development project. "They're simple things—management just has to have the discipline to ask," Rubin says.

Measure the "soft" stuff. Many IS executives think of benchmarking as a tool strictly for repetitive processes.

"Benchmarking, in my mind, is something you do for turn-the-crank type operations," says Scott Heintzeman, vice president of knowledge technologies at Minneapolis-based Carlson Hospitality Corp., which owns Radisson Hotels. Carlson Hospitality tracks non-IS statistics such as cost per reservation and also production-related statistics such as transaction speeds, order entry procedures and call handling as well as revenue per room, Heintzeman says. Nevertheless, companies that depend heavily on knowledge management are forging ahead with ways to measure those mushier kinds of topics.

IBM Global Services, a \$27 billion business unit that provides consulting, data center outsourcing, systems integration and application development, is a company that looks to measure its own soft issues. For quantitative measurement, it examines how much revenue is generated from patents held by the company and compares it with the same category of revenue at other high-tech groups and then partners with other heavy hitters to improve knowledge exchange processes. The group also looks at publicly available data on U.S. patent productivity and data on other companies' use of intellectual capital. Kuan-Tsae Huang, director of knowledge management and asset reuse for the

Impeccable References

Benchmarking resources are easy to find

THE SEARCH FOR NUMBERS, PRACTICES AND BENCHMARKING PARTNERS CAN lead in many directions. Consultants offer networks of relationships, and consortia like the American Productivity & Quality Center (APQC) in Houston connect their members to benchmarking groups on topics such as knowledge management. Secondary research through trade periodicals and books can also help identify companies setting the pace in particular process areas.

Fidelity Investments Systems uses a broad array of sources. It participates in benchmarking databases such as APQC's, retains Boston-based consultancy ICEX Inc. to help network with new partners that excel at various activities and uses Gartner Group Inc.'s Real Decisions service to compare cost and performance of telecom services and computer operations.

For industry-specific numeric comparisons, Carlson Hospitality calls on The Graycon Group Inc. in Schaumburg, Ill., for call center and cost-per-reservation statistics and Smith Travel Research in Hendersonville, Tenn., for other, more general numbers.

—D. Slater



Mount Pleasant, N.Y., group, uses the term “knowledge intensity” to cover various measures of activity in the consulting group’s knowledge systems—refresh rates of information in the database and contribution rates, which is the number of workers posting information on a daily basis, for example.

Arthur Andersen LLP also benchmarks its knowledge management efforts. There are several well-known objectives for successful knowledge management systems, according to Toby Bell, a director in the partnership’s Technology Solutions group: ease of use, “critical mass” of daily content updates and support from upper management. Bell’s group designs and develops the company’s Lotus Notes knowledge databases and has written an applet that collects usage statistics, including traffic from upper managers. A joint Andersen-UCLA study that found more than 80 percent of executives use only the e-mail capabilities of groupware packages such as Notes gives the group an important benchmark. Bell’s group alters the interface and

application structure to find the setup that elicits optimal usage. Executive participation is a simple measure, yet it matches the most important strategic goals for the users. “On any given day, our professionals don’t really have access to transaction processing systems; what they want is to be able to find an answer for a client,” Bell says.

Hit all bases in your comparison.

Process ideas and numerical comparison come from three sources: business units within your own company, competitors within the same industry and process leaders in other industries.

Internal sources are easy to overlook, but they can provide sensitive numbers and process suggestions with the least amount of difficulty. AT&T Corp. has IT forums to encourage process exchange among its dozen-plus business units.

Pitfalls as well as benefits lurk once benchmarking goes outside the corporate walls. On one hand, companies need apples-to-apples comparisons in order to find meaningful numbers; those comparing themselves to companies with different strategic objectives and different customers might be misled.

On the other hand, sometimes the Hatfields are reticent about exchanging processes with the McCoys, so many companies compare industry-specific numbers from third-party sources but steer clear of actually partnering with competitors. Fidelity Investments Systems avoids benchmarking with other financial services firms. “It’s just a little too close to home,” Danforth says. “At a private company, there’s some concern that sharing practices will give away the store,” he notes.

That points to the third base for benchmarking: trading processes with world-class organizations outside your industry. Often, the best way to leapfrog competitors—instead of just playing catch-up—is to borrow processes from a completely different type of organization. IBM Global Services has swapped ideas with The Dow Chemical Co., for instance. Even more strange, a film production unit at Eastman Kodak Co. once paired with the Dannon Co. to benchmark. Different though their products—film and yogurt—seem at first glance, both companies follow similar proce-

dures to produce dated, refrigerated goods.

Measure your rate of change. That refrain is another of Rubin’s favorite tunes. “If you’re ahead by four miles, that sounds good. But if you’re going 60 and the other guy is going 120, in two minutes your lead won’t matter,” he says. Perhaps your procurement process takes too long—but are you getting

By Definition

Benchmarking: *Comparing corporate products and practices with the world’s best and then borrowing the work processes that will help close the gaps*

slower or faster? If you are showing steady improvement, that means something different for process revamping than if you’re slow and getting slower. If you’re the one going 120, you might not need to change anything even though you’re trailing at the moment.

Make sure business objectives drive your measuring. Lastly, IT departments that benchmark cannot lose sight of the business objectives. Effective benchmarking projects are commonly one part of a broader process improvement effort that is focused on supporting the company’s overall strategy.

Not every process demands best-in-class performance; in many cases, shaving an extra quarter of a second off network response time isn’t worth the pain. “The benchmark might be 20x, but my internal customer needs only 4x. If that’s the case, we’re doing our customer a disservice by trying to get to that world-class benchmark,” says one IT benchmarking manager at a Fortune 500 manufacturing company. “In some instances, we want to be world class to make our business successful; in others, we don’t need to be. Some would say, ‘No, we want to be world class in everything.’ That’s a noble goal, but it could cost a lot of money.” **CIO**

Senior Writer Derek Slater can be reached at dslater@cio.com.

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Anatomy of a Failure

The inside story of a fatally flawed
data warehouse project

BY LAUREN GIBBONS PAUL

Wasted time. Squandered money. Lost jobs. Ruined reputations. Jeopardized careers.

Project failures are the dirty little secret of data warehousing. Anyone who has spent time around data warehouse projects is likely to have chalked up a failure or two. The

majority of those debacles can be attributed not to technology snafus but to lack of strong executive sponsorship and to poor management.

For many, being part of an abysmal data warehouse project is a rite of passage. But that doesn't make it any easier. The project manager and consultant who were central figures in the data

Reader ROI

BUSINESS AND I.S. EXECUTIVES eager to reap the benefits of a data warehouse set themselves up for failure if they ignore the warning signs of disaster. This frank look at a data warehousing fiasco will help readers

- ▶ Understand why strong executive sponsorship is critical
- ▶ Recognize the warning signs of impending failure
- ▶ Sidestep potential roadblocks to success

warehousing effort at the company we'll call Close Call Corp. deserve credit for candidly sharing their experiences here. Through a spokesman, the CEO of Close Call—who pushed for the warehouse in the first place—declined to comment.

Because it's so hard to do data warehousing well, the kinds of things that went awry in this case study could afflict any implementation in any industry. Do not, therefore, assume your company is safe from a failure of this magnitude. If you look closely—and are honest about it—chances are, you'll recognize some of the red flags raised here.

Editor's Note: All names in this case study have been changed.

THE ROAD TO HELL IS PAVED WITH golf games. For the CEO of Close Call Corp., his trip netherward began with a day on the links in the fall of 1995 with a software vendor.

At the time, the CEO was particularly vulnerable to a "business-transforming" pitch. He knew he needed to make technology changes—and fast. His teleservices company, which he'd founded with \$200 in the 1970s and had grown into a modest empire worth \$100 million, was at a crossroads. Intent on choosing the straightest path through a double-digit growth period, he was searching for technological help. So when

By Definition

Data Warehouse: *A relational database filled with large volumes of cross-indexed historical business information that users access with desktop-based query tools. The warehouse resides on its own server and is separate from the transaction-processing or run-the-business systems.*

the vendor tempted him with visions of integrated data flow and information on demand, the CEO couldn't resist.

Historically, Close Call's outbound (telemarketing) and inbound (catalog sales) business units had operated as totally separate companies. The company had recently gone public, and rapid growth was putting major pressure on its antiquated and proprietary systems. The vendor made a convincing case that a data warehouse was the answer to Close Call's prayers. Nothing to it, went the siren call, you can be up and running on a fully functional data warehouse in three to four months. The CEO began salivating at the thought of providing a unified view of Close Call's business data to its autonomous business units.

But with 1996 already shaping up to be a banner year for Close Call, the timing for a data warehouse project could hardly have been worse. The company was planning to expand from six call centers to 116, implementing new, open switching systems in the new centers to enable automatic dialing and call routing. In addition, information systems (IS) was updating all of Close Call's internal management systems by deploying new human resources and general ledger software.

When the CEO returned from his fateful golf game and sounded the call for a data warehouse, he ensured that 1996 would be a year to remember—but not for the reasons he'd hoped.

Unrealistic Expectations

THE CEO EXPECTED THE CAN-DO CULTURE that he'd nurtured from the early days of the company to carry it through this period of exponential growth and technological change. He believed that making all the systems changes—including building the data warehouse—in a very short time frame was just a matter of getting the right people for the job, according to a consultant we'll call Michael Farraday, cofounder of the data ware-

Red Flags

Signs the Close Call data warehouse was destined to fail:

- ▶ No pre-launch objectives or metrics
- ▶ Many major systems projects underway simultaneously
- ▶ The CEO set budgets and deadlines before project team was on board
- ▶ No insider presence on data warehouse project team
- ▶ An overburdened project manager
- ▶ Source data availability unconfirmed at the outset
- ▶ No user demand for sophisticated data analysis
- ▶ No routine meetings of executive sponsors and project manager
- ▶ No initial involvement of business managers

Visit CIO's Data Warehouse Executive Resource Center (www.cio.com/CIO/rc_dw.html) for a collection of data warehousing resources. For a list of 10 data warehousing mistakes to avoid, visit The Data Warehousing Institute's Web site at www.dw-institute.com/papers/10mistks.htm.

—L.G. Paul

housing and decision support consulting firm that was called in to do the warehouse design and data modeling. "He put decisions in place and said, 'Go make this happen.' That approach had always worked in the past. Not this time," says Farraday.

Based on the few technology tidbits he had obtained from the software vendor on the fairway, the CEO was convinced he could have a 500GB production data warehouse up and running in four months despite the fact the existing IS staff was already stretched to the limit. Before the project team was on board, he set the project deadlines and a budget of \$250,000, the ultimate no-no, says Farraday, who has 12 years' data warehousing experience.

Because no one in-house had data warehousing experience or time to devote to the project, five outside people were hired. The outsiders included Manager of MIS Jackie Pemberton (not her real name), who was brought on in part to manage the data warehousing project, and a director of MIS, both of whom had proven data warehousing track records and a combined total of nearly three decades of experience in the field. Pemberton was also put in charge of the general-business systems software rollout.

Unrealistic time and resource allocations alone might not have grounded Close Call's data warehouse had the business ranks been clamoring for the information it could provide. But because they'd never been exposed to an analytical environment before, the users didn't know what they were missing. Indeed, the business unit managers were quite content with the canned reports they could get from a DOS-based Reflex database. The few who needed more analysis entered the report numbers into a spreadsheet and did rudimentary manipulations.

The lack of demand for a new reporting system foreshadowed a virtually insurmountable problem, says Farraday: Down the road, the users would not be willing to commit the time and effort required to make the warehouse a success. "The challenges go up dramatically if the data warehouse represents the first analytical environment," says Farraday. "[The users] never really understood what a data warehouse could do."

The Project Launch

THE NEW DIRECTOR OF MIS ASSEMBLED THE initial project team, consisting of Pemberton, two senior managers from sales and telemarketing and a database administrator as well as Farraday and another consultant from his firm. Pemberton, the director of MIS and the consultants pushed back on the scope of the



project, the preset deadlines and budget, but the CEO stuck to his guns. Ultimately, he grudgingly accepted the idea of a pilot in five months rather than insisting on the full-blown production warehouse. But he never seemed to understand the magnitude of the undertaking, says Farraday.

From the start, the data warehouse lacked a clearly defined business objective, mostly because the users had never asked for greater analytical abilities. Pemberton believed she would be able to articulate the business case herself after gathering detailed user requirements.

Early on, Pemberton met weekly with the director of MIS, who in turn met separately with the executive sponsors (the CEO and the CFO) every week. Only when things began to fall apart several months later did the four begin to meet face to face each week. Also, the general managers of the business units said they were too busy to get involved in the requirements assessment stage of the project. "The feeling was, 'Go talk to my guys. They'll tell you what they need,'" says Pemberton. In retrospect, she says the director of MIS didn't reach out to the business users as much as perhaps he should have.

Despite the early uncertainties, optimism prevailed at the project launch. "[The director

Despite the early uncertainties, optimism prevailed at the project launch. "The director of MIS had so much positive energy. I really thought together we could make this happen."

—Jackie Pemberton

of MIS] had so much positive energy. I really thought together we could make this happen," says Pemberton.

Collecting User Requirements

FARRADAY AND HIS CONSULTING COLLEAGUE saw the process of gathering user requirements for the warehouse as critical. Along with Pemberton, they embarked on three painstaking months of interviewing the key users as 1996 began. Instead of merely asking users what data they needed from a data warehouse, they invited them to talk in general terms about their jobs, homing in on how their job performance was evaluated and how they managed people.

Although the users complained the interviews took too much time, everyone felt this stage had been a resounding success. In spite of the very separate business units, the team was beginning to build the consolidated picture of the business they'd need to begin constructing the warehouse.

Building the Business Model

AS THEY COLLECTED USER REQUIREMENTS, Pemberton and Farraday set about creating a business model that would capture the business professionals' requirements in their own terms. Independent of technology, this model would define the business dimensions (for example, looking at the business in terms of products, locations or time periods), attributes, relationships, facts and logical navigation paths, all of which would translate to the design of the warehouse. The challenge was to get the distinct and autonomous business units to settle on these critical definitions.

This, too, went much more smoothly than anticipated. "People from different groups were agreeing on things they had never agreed on before," says Farraday.

The bad news was that the model revealed a highly complex set of business requirements and an inconsistent group of data "facts" that would populate the warehouse. Unlike a retail data warehouse in which the quantity of a particular SKU sold at a particular time becomes an unalterable "fact," performance of customer service representatives—what Close Call was trying to measure—was much more subjective and obscure. Business managers had created their own customized spreadsheets into which they reentered the data they wanted to examine from the Reflex database reports. Because the managers looked at things differently (for example, some defined "revenues" as actual revenues, others considered them estimated revenues), defining the fact groups therefore became a hellish ordeal that required sorting through literally hundreds of calculations based on subjective assumptions. This process alone took nearly a month, says Farraday, which meant the team couldn't start building the relational format and user interface. It was a delay the executive sponsors were not inclined to forgive.

Source Data Crisis

THEN CAME THE BIGGEST BLOW TO DATE. With the pilot deadline at hand, Close Call's IS veterans, who believed their jobs were threatened by the data warehousing project, finally admitted to the project team that there was no way to populate the warehouse. The only data available was basic customer and transaction information that had been captured by Close Call's proprietary telecommunications switching systems as a byproduct of call routing. Writing a program to extract that data for the warehouse would be too expensive and time-consuming even to consider. Clearly, the old switching sys-

Post Mortem

Lessons from the Close Call data warehousing disaster

- Executive sponsorship and partnership with IS are the most critical success factors for a warehouse. If possible, establish dual leadership by business and IS executives for the project or pick a project manager from the business side of the house, says Jane Griffin, president and CEO of Systems Techniques Inc., an Atlanta data warehousing consulting and software company.
- Don't let the project proceed without a clear understanding of the business objectives and how they will be measured. "The warehouse must have a strong business imperative," says Stephen Graham, vice president of software research for International Data Corp. Canada in Toronto. (IDC and CIO Communications Inc. are sister companies.)
- Do an incremental pilot project to determine if you can realize the projected benefit.
- Expect to make a major investment in ongoing management of the data warehouse. "Any parent knows birth pales in comparison to taking care of the kid every day," says Wayne Eckerson, director of the Business Intelligence and Data Warehouse Service of the Patricia Seybold Group in Boston.
- When all else fails, cut and run. Data warehousing consultant Barbara Gaskin gives Close Call credit for making a clean break with the project once it was clear the pilot had failed. "It was a smart decision to abandon that project. Companies often hemorrhage money serving one small user group," says Gaskin, principal at Decision Support Technology Inc., a consulting firm in Wellesley, Mass.

—L.G. Paul

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“They had wanted their production warehouse in place in four months and at the end of eight months we said, ‘Here’s your itsy-bitsy little one-page pilot, and guess what, you’re not even getting your warehouse.’”

—Jackie Pemberton

tems in the original six call centers would have to be updated with open technology to capture the data for the warehouse electronically, says Farraday.

Panicked at the thought of breaking that news to the executive sponsors, the team jury-rigged a way to populate the pilot by parsing the DOS-based Reflex reports and manipulating the report data into a relational database format. But the handwriting was on the wall—without replacing the proprietary switching systems, there would be no data warehouse.

By this point, Pemberton and her team were in overdrive, working 15-hour days, six days a week. Twice-weekly trips to Close Call’s other major corporate office in the next state also took their toll. “I was trying so hard, but it was an emotional nightmare,” says Pemberton.

The Pilot

THE PILOT CONTAINED A small summary-level set of data that the team had manipulated and manually loaded into the database. After the pilot was complete in August, the team faced an unpleasant revelation. Even if there had been pristine

source data, the users weren’t having any of it.

“They said, ‘You’re giving me what I already had, and it’s harder for me to get it and the data doesn’t even match my hard copy,’” recalls Farraday. “We lost the users at that point.”

The anger began to build and hit a crescendo in the executive suite. “They had wanted their production warehouse in place in four months and at the end of eight months we said, ‘Here’s your itsy-bitsy little one-page pilot, and guess what, you’re not even getting your warehouse,’” says Pemberton.

It was all over but the shouting.

Crashing Down

A FEW WEEKS AFTER THE PILOT DEBACLE, Pemberton found herself with a new boss. The director of MIS, who had been promised the CIO spot, ended up with two new bosses, who shared the responsibilities of IS management as vice presidents of technology. To no one’s surprise, the director of MIS elected to leave the company shortly thereafter.

Undaunted, Pemberton assembled a team of

57 IS staff and business users and in a few weeks created a detailed plan for reengineering the outbound business processes and updating their systems. With her heart in her mouth and passion still unspent, she presented her plan to the executives in October 1996, telling them it would take two years to reengineer before they could even begin the data warehouse. She said she believed nothing less than the survival of the company was at stake. Her words fell on deaf ears. “They said, ‘Thanks for your work, but no thanks,’” says Pemberton. No one spoke in favor of her proposal at the meeting.

The Aftermath

CLOSE CALL’S CEO CANCELED THE DATA warehousing project in October 1996. Though it was hardly a shock, Pemberton was shattered. “I had never been involved in a situation where I failed at my job. I had gone in with such high hopes. I really wanted to give them a data warehouse,” says Pemberton. In February 1997, she quit without a new job nor any prospects of one and took three weeks off to recover. (Pemberton reports she is now a senior data warehousing manager for another company and has just delivered a pilot of a data warehouse.)

From the CEO’s point of view, the entire project had been a fiasco, says Pemberton. The anemic pilot was delivered four months later than the initial (highly unrealistic) deadline for the fully functional warehouse. Although the CEO had budgeted a paltry \$250,000 for the project, the team had spent nearly \$750,000 on hardware, software and services.

“Management finally said, ‘We have spent a lot of money, and we have gotten no value,’” says Pemberton. “It was devastating.”

Besides wasting money and time, the project cost Close Call 50 percent of its IS staff, about half of whom quit, according to Farraday. Today, Farraday reports that the company is reengineering its outbound business processes with an eye toward another data warehousing attempt. But in the meantime, Close Call’s stock price has taken a beating, losing more than two thirds of its value between October 1996 and September 1997. Farraday attributes the company’s change of fortune to attempting too many technology projects at once. “They bit off way more than they could chew,” he says.

So much for believing everything you hear on the golf course. **CIO**

Lauren Gibbons Paul is a freelance writer in Belmont, Mass. She can be reached at laurenpaul@sprintmail.com.



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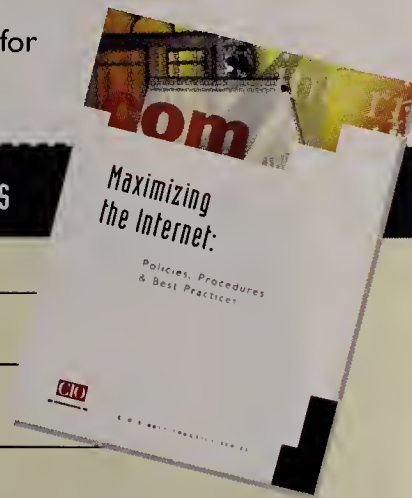
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Adrian J. Slywotzky, business consultant and author of *Value Migration: How to Think Several Moves Ahead of the Competition* (Harvard Business School Press, 1996), argues that the only way to constantly hit the moving target of success is to make your business model evolve faster. In other words, if you keep working on being the best at what you do today, you might find what you do is quickly losing its value with customers. At a time when IBM still made the best mainframes in the biz, its stock was in a free fall—PCs were where the value was.

In fast-evolving environments, Slywotzky argues, what really matters is market value—and the ability of a business design

to create and capture that value—the crudest measure of which is stock price (see “How to Measure Corporate Success,” Page 64). Are you meeting your customers' needs? Have you chosen the right customers to serve? Power comes from paying attention to your customers, he says, not from gaining market share, the traditional measure of success. Recently, Slywotzky spoke with Senior Editor Carol Hildebrand about how companies can anticipate those landmark shifts, which he dubs “value migration,” and reinvent themselves to keep pace.

CIO: What is value migration?

Slywotzky: Value migration is about the flow of value away from old industry business models to new models. So in the steel industry, value flowed from the traditional steel makers to mini-mill operators. In the airline industry, we saw the move in value from big hub-and-spoke airlines like TWA to short-hop, point-to-point outfits such as Southwest. Invariably, this flow came about because the new business models understood

the customers' business needs and priorities and delivered the solution efficiently. Coca-Cola is another good example. It understood that its customer was not the person who buys Coke but rather the bottler. The company moved from being a syrup maker to managing the whole value chain.

On the most basic level, value migration is driven by the customer?

Yes. Customers' priorities don't stay put. When they move, there's a mismatch between what's important to the customer and what a traditional company provides. Organizations must then invent new ways of doing business that match the new priorities. And customer needs are changing quickly, about every three to four years. Ten years ago, the big priority was quality; then it became building service and features into a product. Now, we don't care about the product as much as a total customer solution built around that product. For example, GE offers not just a product but financing to help purchase it. GE's business model actually can improve its customers' profitability.

How big a factor is value migration?

It is very large and getting larger, but it's lumpy by industries. It has played out a major first round in retail, airlines, computing and steel. It is about



to begin in financial services, chemicals and utilities. But value migration doesn't stop. Once one cycle of it plays out, customer priorities shift, and migration starts afresh. Companies that had the right business model in the previous cycle can't rest on their laurels. Look at Microsoft. They understand that the past means nothing, and if they're not careful, they could suffer WordPerfect or Borland disease. There's a simple way to think about it: The definition of what your company is has less to do with a formal industry category definition and more to do with what your customer thinks his choices are. So if you spend your time learning where the customer is moving, that's the best early warning.

What is the best way to get close to customers?

In the traditional business world, getting a snapshot of the customer was more than enough. Conventional market research was done periodically and was relatively tactical. But conventional market research tends to get you yesterday's target. It asks a lot of standard questions without taking the customer's economic model into context. Top companies are switching from an episodic to a more continual process of monitoring customers. Instead of a snapshot, firms are building a video of the customer. They aren't asking only whether their current product meets

customer needs. They're asking what the customers' priorities are, which helps mold future business models.

Smart companies also understand that they should expand the customer field of vision. Look at Intel, for example. They've looked beyond their OEM distribution chain to the end-user consumer. Hence, the Intel Inside campaign, which caters to the customer. Or Charles Schwab, which understands that financial planners are just as important as investors and have needs of their own. Schwab made it much easier for financial planners to do business with Schwab. The point is, you should examine your customers in detail and build your business design around what's most important to them. Then, create business systems to deliver that product in the most resource-efficient way possible.

What are the attributes of a good business design?

It has three characteristics: It is customer relevant, resource efficient and internally consistent—that is, your strategic direction is matched by the business infrastructure of your company. For example, a retailer with a high cost structure and an everyday low pricing value proposition is internally inconsistent.

On another level, it helps to do research on new business models that are already successful. There have been

How to Measure Corporate Success

Traditional Method: Market Share

IN MOST CASES, MARKET SHARE IS A company's revenue, give or take 10 to 20 percent; if a company gained market share, profitability followed. But if market share is what it takes to win, it's difficult to explain companies like IBM, GM and Kodak that at points in their histories won market share, but not profitability.

Modern Method: Market Value

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BUSINESS MODELS

about 10 to 15 business models built in the last 10 years, and searching other industries will frequently turn up a model that's almost entirely transferable. Every industry has a couple of unique characteristics, and most companies in that industry compete the same way with the same model. Then, there are always a couple of companies that stand out and compete in a different way.

What kind of a role does technology play in value migration?

We're going to see a profound change in how IT is used to anticipate shifts.

The most fundamental part of a business design is customer selection, but in big companies today, information about the customer is spotty or doesn't exist. Most Fortune 500 companies have concentrated systems-building on internal processes, such as internal finance, and the information in those systems is superb. But the new business designs demand outward-facing, customer-centric systems that analyze the economics of the customer. Companies need to build systems that answer questions such as what is our profitability by customer? Who are our most and least profitable customers, and why? Most companies cannot answer these questions. They need to develop systems that show in what direction customers are heading and how quickly they are picking up momentum—almost in real-time.

MODEL MIGRATION: MERCK

IN THE MID-'70S AND EARLY '80S, MERCK & CO. INC. REALIZED THAT ITS CUSTOMERS were not only physicians but also the FDA. The challenges: Doctors were likely to stick with the first innovative drug that appeared in a particular field. (Think, for example, of the popularity of Prozac.) Moreover, the time spent in a lengthy FDA drug review translated into millions in lost sales.

Roy Vagelos, then head of research and development (and now CEO) for Merck, changed the company's business design to concentrate on developing a few "blockbuster" drugs and getting them to market first. He did this by creating cross-functional project teams for each high-potential drug. He also asked for FDA input early in the development process, thus making Merck's relationship with the agency less antagonistic and more cooperative.

Merck also spotted the next cycle of value migration, driven by rising health costs and managed-care organizations. Vagelos reorganized Merck's business design in the early '90s to respond to the needs of HMOs and Medicare, which buy in bulk and look for lower-cost items.

Value created from 1980 to 1994: \$38 billion.

SOURCE: VALUE MIGRATION, ADRIAN J. SLYWOTZKY

Will the role of technology in supporting people internally shift as well?

Yes. If we've got a changing emphasis from products to customers, there's also a switch from hard assets to employees. What mattered before was product production. Now, the real value to the customer lies in the knowledge or expertise a company amasses, whether it's how to launch a product or how to solve a customer's problem. As knowledge becomes more important, the biggest waste in companies comes from talented people reinventing something that's already been

solved. IT will play a major role in enabling creative people to spend less time reinventing solutions.

For example, GE's jet engine people pulled answers from previous work by locomotive engine designers to help answer questions they had on long-distance engine performance. The material was not a complete fit, but a lot of the basic underpinnings provided a very good platform and saved a tremendous amount of time. That kind of stuff is the exception today in large companies.

How does value migration play out differently overseas?

Value migration is headed to Europe and Japan, and both geographic regions are in for a rough ride. Their markets are not nearly as open, nor their investment communities as receptive as the United States. But they also have to figure out how to get product-centric economies to move in the direction of a more customer-relevant business design. Particularly in the case of Japan, we're talking about people who have built a thriving economy from 20 years of being product- and market-driven. As they face an economy that requires more knowledge than assets, they must learn to build completely different business designs. **CIO**

MODEL MIGRATION: GENERAL ELECTRIC

CHAIRMAN AND CEO JACK WELCH REALIZED THAT CUSTOMERS VIEWED MANY OF General Electric Co.'s offerings as commodities—products that are distinguishable from competitors' only by price. The customer also suffered from the product overload brought on by a saturated market. The customer was, however, very interested in financing, or the ability to buy goods without having cash upfront. GE got rid of billions in manufacturing operations and vigorously built up GE Capital, effectively "escaping value decline on one hand and enjoying vigorous value growth on the other," notes Adrian Slywotzky. Welch also built GE Plastics into a formidable competitor to steel by building strong relationships with senior executives in the auto industry and using their input to create new products.

Value created from 1980 to 1994: \$97 billion.

SOURCE: VALUE MIGRATION, ADRIAN J. SLYWOTZKY

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Agenda

Welcome & Opening Remarks

Frank Chisholm

Innovations in Information Access

Geoffrey Moore, Consultant and Author of Crossing the Chasm and Inside the Tornado

- Patterns in technology adoption
- Different strategies at different stages

Raising the Corporate IQ

Dr. Larry Harris, Founder, Linguistic Technology Corporation

- Historical pitfalls
- The spectrum of information-access solutions
- Practical applications - progress to date
- Strategies for success

Removing Barriers to End-User Access
& IS Productivity: Industry Roundtable

Bob Procaccini, Director of Strategic Technology Development, American Express Institutional Services
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BY DOUGLAS HUBBARD

THE "I.T. VALUE MEASUREMENT PROBLEM" is ubiquitous in companies today. Business executives often hear a mantra from their IT departments that goes something like this: "We can't measure the value of IT. It's too intangible." If the line works, and IT leaders persuade business executives that IT investments are somehow fundamentally different from other types of business investment, IT is relieved of the responsibility of attaching dollar values to those investments.

Some high-profile CIOs have gotten extended mileage from this approach. Paul Strassmann (the CIO guru) often recounts the story of being put on the spot to justify the costs of IT at Xerox Corp., where he was corporate director of worldwide computing. Since that uncomfortable experience, he has argued that evaluating an IT investment in the same manner that most other departments evaluate their efforts is nearly impossible. After all, he points out, accounting departments are never required to justify their budgets. IT is just as basic to the business as accounting, right? So the IT budget likewise should be exempt from the messiness of justification.

As one might imagine, this position is popular among some IT executives because it gets them off the hook. There is only one problem. Many business executives just aren't buying it. And they shouldn't. Unlike the accounting department, the IT department typically has a large and rapidly growing budget. In addition, most IT departments have had at least a few high-profile failures, causing business executives to be somewhat suspicious of IT's value.

Other IT executives believe that only pseudomeasurements are possible. A method misleadingly dubbed Information Economics (I defy anyone to find any real economics in this method) was developed by Marilyn Parker and Robert Benson. It is basically a subjective scoring procedure that computes a composite score based on a completely arbitrary formula. It is, in effect, a nonquantitative method masquerading as a quantitative one by using numbers and a simple formula.

The first problem is that results have no meaning when compared to other investments: What would you rather have, a retooling of a plant with a 62 percent ROI or an IT investment with a "score" of 95? The second problem is that, to date, there is no empirical evidence that this method improves decisions.

So how should CIOs deal with the problem of measuring IT value? They should start by considering the possibility that the value of IT actually is measurable. Of course, this flies in the face of much of the last two decades of IT dogma, but then it wouldn't be the first time dogma proved wrong.

In seminars that I give and conferences where I speak I always challenge the audience to come up with the most difficult, even impossible, IT measurement problems they can think of. Then we determine how to derive a measurement. So far no suggested intangible, no matter how difficult it originally seemed to measure, has ever lasted 20 minutes in this analysis.

The rather radical-sounding position I take is that all "immeasurability" is just an illusion caused by three basic types of misunderstanding about measurement problems:



- The object of measurement (i.e., the thing being measured) is not understood
 - The concept or the meaning of measurement is not understood
 - The methods of measurement—proven techniques used by science—generally are not well understood
- Once IT executives are coached in each of these areas, they seem quite capable of solving their own measurement problems.

The Object: Understanding What You're Measuring

"When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the state of science."

—First Baron Kelvin

Understanding the object of measurement simply requires being specific. When we use terms like employee empowerment, customer relationship, or strategic alignment, do we really know what we mean? Often we don't. IT project managers or business sponsors label these things intangibles, relegate them to the intangibles column in their cost/benefit analysis and think no more of it. But I find that usually more specific, unambiguous measurables underlie these ambiguous concepts.

For example, suppose someone says that information availability is an intangible that would supposedly result from a better document management system. What is meant by information availability? Perhaps it means that people spend less time looking for information. That is a measurable quantity for which we can calculate an economic value. Perhaps it means that information is lost less often. That is also measurable; if this information affects some routine business decision (like the approval/disapproval of an insurance claim) then we can find the economic value by measuring the effect that not losing that information has on reducing costly errors. Perhaps it really means that losing information causes extra work to re-create data (like redoing engineering drawings

because the originals could not be found). Whatever is meant by "information availability" can be boiled down to something more concrete and therefore measurable.

Some useful tools can help you identify the clarified tangibles that exist beneath your intangible. They are used in what I refer to as The Clarification Chain. The objective of this process is to analyze and define intangibles so that they can be replaced with more clearly understood tangibles.

The Clarification Chain

**If something is better,
then it is different in
some relevant way.**

**If it is different in
some relevant way,
then it is observable.**

**If it is observable,
then it can be counted.**

**If it can be counted,
then it is measurable.**

Is it logical to say that more X (an intangible) is better than less, but it is in no way different or observable? Then in what way is X "better?" If you believe X is a good thing, then you must also believe that it is somehow different from not having X. And if it is different in a way that is relevant, then it must be observable. So ask what the observable consequence is. Once you have identified an observable consequence, thinking of a way to measure it is pretty easy.

Here is another useful exercise. Create

a thought experiment in which you imagine you have cloned an entire organization into twin organizations, A and B. The two are identical in every way except for one thing: Organization A has more of intangible X than organization B. Now, imagine that you are an objective observer standing outside these organizations looking in. What do you imagine you observe to be different between A and B? If X is such a desirable thing, then there has to be some difference. What is it? Are certain things getting done cheaper or faster? Are the customers of A likely to come back for more business than the customers of B? Is employee turnover lower? Are mistakes of some type less frequent? Just think it through—and be specific.

After thinking through the intangible, we often find that our only barrier to measurement was that we didn't understand what we wanted to measure. Once we have clarified the ambiguously defined intangible we can address some other problems with the perception of immeasurability.

The Concept: Understanding Measurement

"Although this may seem a paradox, all exact science is based on the idea of approximation. If a man tells you he knows a thing exactly then you can be safe in inferring that you are speaking to an inexact man."

—Bertrand Russell,
English mathematician
and philosopher

Measurement, believe it or not, is a widely misunderstood concept. It's often mistaken for a process that produces an exact number. If you are told that something cannot be measured because there is no way to put an exact number on it, then you know that the problem is a misunderstanding of the measurement concept. The way scientists see it, measurement is the reduction of uncertainty about a quantity through observation.

The key element here is reduction of uncertainty—which is not necessarily (in fact, almost never) the elimination of uncertainty. If you tell me more than I knew before, then you have reduced my uncertainty. If you have told me that orders would be filled 10 to 30 percent

Checks & Balances

faster with some proposed system, then you have reduced my uncertainty if I previously thought the range was 0 to 60 percent.

Actually, if a process produces an exact number (such as an accounting formula), that is a good indication that it is not a measurement at all. It's just a calculation. Measurements are pragmatic observations and observation never eliminates uncertainty. This is why all realistic measurements in science, engineering, actuarial science, economics, etc. are expressed as "probability distributions." Simply put, a probability distribution is a range of possible outcomes and their possibilities. If you can reduce the range of possible values by a bit, you still have a

If a process produces an exact number, that is a good indication that it is not a measurement at all. It's just a calculation.

measurement. In fact, that small change in uncertainty might be enough to sway the decision.

Methods: Understanding Ways to Measure

"Anything is measurable in a way that is superior to not measuring it at all."

—Tom DeMarco,
co-author of *Peopleware: Productive Projects and Teams*

After intangibles have been clarified by developing unambiguous definitions and measurement itself is better understood, many more things appear to be measurable. But a few perceived immeasurables could remain because CIOs may not be

aware of the variety of methods used to measure.

How often do IT execs conduct simple random samples or controlled experiments in order to measure some quantity of interest? The answer is not nearly so often as in other fields—including other areas of business. If I may be so bold, perhaps the problem is that Computer Science is not really taught as an empirical method like other sciences. Methods of fact finding in this culture generally do not include basic tools of direct observation. In Joint Requirements Planning (JRP) workshops, analysts and users spend considerable time talking about the business, and the analysts generally take the users' word for quantities such as orders processed per day, error rates, etc. Analysts ask the users how long an order takes to process instead of finding a way to observe it directly.

IT executives seem rarely to consider simple scientific observation as a solution, though basic elements of the scientific method are widely used in market research, actuarial science, product development (both technical and non-technical), operations research and even human resources. (See "Looking for Measures," this page, for some hints on how to identify a method of measurement for your measurement problem.)

Remember, no matter how difficult your measurement problem seems, the first step in measurement is to change an assumption you may have been making for a very long time. Instead of assuming that it is a fundamentally immeasurable intangible, assume that it is measurable. Then the only question becomes whether you are clever enough to figure out how. **CIO**

Douglas Hubbard is director of applied information economics with DHS & Associates Inc. in Rosemont, Ill. He can be reached at dhubbard@dhsassoc.com or 800 297-5601.

Looking for Measures

Ask Yourself:

Does it leave a trail of some kind?

Could it be projected from past experience?

Is it possible that this may already have been researched by someone outside your company?

Could it be observed in real-time?

Could it be estimated with random surveys?

Could you set up a test comparing this to an alternative (i.e., a controlled experiment)?

For Example:

- Employee turnover per year
- Currents level of customer retention

- The productivity of programmers
- Growth in product demand

- The average life span of a sales-force automation system
- The average cost of IT training for given type of user

- The amount of time an equipment operator spends filling out forms

- The time employees say they spend doing some activity
- The percentage of customers that say faster response to problems would be a significant factor

- The effect of a new system on the productivity of a sales clerk
- The effect of a new system on customer retention

Resources:

- Database—you may not be aware of relevant data already tracked in your company
- Auditors—it's their job to re-create the past from documents

- Market research—this part of your firm might be able to give expert statistical assistance

- Corporate librarian—they can usually point you in the right research direction

- Just ask if you can watch or ask them to keep a journal (for a short period of time)

- Human resources—they might be able to help with the sampling of employees
- Market research—they may already be doing some customer surveys that you could add questions to

- Perhaps other researchers in your company could help you set up controlled experiments



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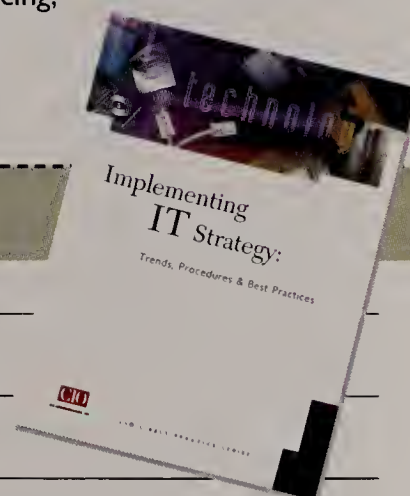
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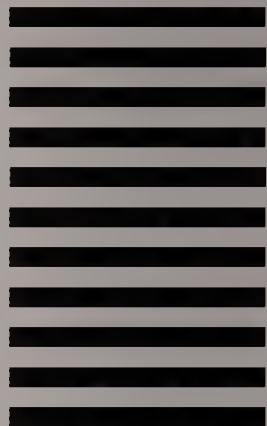
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Wary of Groupware?

GROUPWARE IS NOTORIOUSLY TOUGH to define. Its naysayers (and there are many) might describe it as teamwork software that's more powerful than mere e-mail and less useful. Its proponents, on the other hand, will tell you that groupware is a kind of software that functions much like the conductor does in an orchestra. While the conductor doesn't actually create any music, he or she makes all the musicians sound better by helping them stay on the same beat and in harmony. Similarly, team members are more productive when they collaborate and share ideas. Groupware provides a framework for that teamwork.

What specifically does teamwork software do?

Groupware packages are diverse in the functions they offer. Most include a shared database where team members can work on common documents and hold electronic discussions. Some include group schedulers, calendars and/or e-mail. Others focus on real-time meeting support. Combined, these pieces allow team members to work on a single document, discuss ideas online, maintain records, and prioritize and schedule team work and meetings. A true groupware package should include several of these functions, not just one.

By that narrow definition, examples of groupware include Lotus Development Corp.'s Lotus Notes, Microsoft Corp.'s Exchange, Novell Inc.'s GroupWise, Netscape Communications Corp.'s Collabra Share and Ventana Corp.'s GroupSystems. Some software companies are trying to co-opt the term to describe document management software or pure e-mail packages. That, however, is playing loose with the terminology, adding to the confusion about what groupware means.

Why are people so excited about groupware?

Groupware, when implemented correctly, allows com-



panies to share information better. At *CIO* magazine, for example, we brainstorm to come up with the best topics for our articles. Using Lotus Notes to facilitate our story development process, I type a rough idea in the Notes discussion database, then await my colleagues' responses or suggested sources. I can have daily online discussions with writers and editors to determine the merits of each idea. Since the process is ongoing, I don't have to wait for a big meeting to get people thinking about my proposal, and they, in turn, can respond minutes or days later at their convenience (particularly useful for our bureau on the Left Coast). In addition, Notes lets us develop a custom contacts database application so we can share our IS sources.

So why do some say it's less useful than e-mail?

That contacts database I mentioned? Nobody uses it.

Groupware tends to require changes in the way users work, which means it hits much more cultural resistance than e-mail. It's a bit unfair to say groupware is less useful than e-mail, but because it's so much harder to learn, it demands a lot more training (and prodding) for end users. Users don't always dive in as they typically do with e-mail or intranets. For this reason, some companies prefer instead to use those two technologies to facilitate teamwork. So be warned: Buying a groupware package, plugging it in and expecting a magic transformation to occur is an E-Z Bake recipe for failure. Using groupware successfully requires a commitment to cultural and process change from management down. —Derek Slater

Buzzwords

Collaborative

Computing: The act of computer-aided teamwork.

Replication: The process through which computers synchronize data. It ensures

everybody is looking at the most current version of a document, particularly if some users are working remotely.

Workflow: Automates the routing of documents and data through the proper sequence of workers.

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